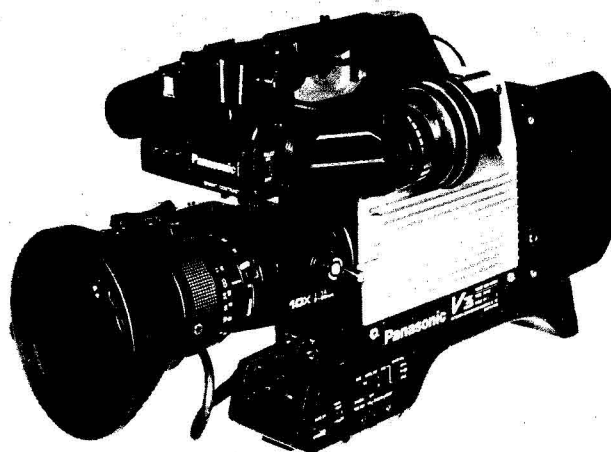


Service Manual

PAL Colour Video Camera
WV-V3 Series



CONTENTS

Vol. 1	Circuit Description	1-1 ~ 1-52
Vol. 2	Adjustment Procedure/Troubleshooting Guide	2-1 ~ 2-41
Vol. 3	Block Diagrams/Schematic Diagrams/Conductor Views	3-1 ~ 3-77
Vol. 4	Replacement Parts List/Exploded Views	4-1 ~ 4-25

Service Manual

Vol. 1

Circuit Description

PAL Colour Video Camera
WV-V3 Series

CONTENTS

• SPECIFICATIONS	1-1
• MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS	1-4
• CIRCUIT DESCRIPTION	1-10
1. Outline	1-10
2. Optics System	1-14
3. Pre-Preamplifier and Preamplifier Board	1-16
4. Process Board	1-16
5. Auto (A) Board	1-31
6. Auto (B) Board/Auto (C) Board	1-36
7. Sync Board	1-43
8. Deflection Board	1-44
9. Auto Tracing White-Balance (ATW) Board	1-50
10. Audio Board	1-51
11. 1.5" Viewfinder WV-VF34	1-52

SPECIFICATIONS

ENG Colour Camera WV-V3E, WV-V3N

Pick-up System :	Middle index prism system using three Newvicon® tubes
Pick-up Tube :	Three 1/2" electrostatic focusing, magnetic deflection Newvicon® tube, type S4701A
Scanning Standard :	625 lines, 50 fields, 25 frames
Synchronizing System :	Internal or External (gen-lock) with RCU/gen-lock adaptor switchable automatically
	Internal : PAL standard
	External (gen-lock) Input : PAL composite signal or black burst signal through RCU/gen-lock adaptor
Subcarrier Phase for Gen-Lock :	Adjustable more than 360° at RCU/gen-lock adaptor
Horizontal Phase for Gen-Lock :	Adjustable from -0.1 µsec to +3.5 µsec at RCU/gen-lock adaptor
Video Output :	Three outputs
	1.0Vp-p PAL composite/75 ohms x 1 (BNC connector)
	1.0Vp-p PAL composite/75 ohms x 1 (14-pin VTR connector)
	1.0Vp-p PAL composite/75 ohms x 1 (32-pin junction connector for RCU/gen-lock adaptor)
Auxiliary Input :	1.0Vp-p composite/75 ohms through RCU/gen-lock adaptor
Audio Input :	Internal Mic Input : -70 dBm x 1 (M3 connector)
	External Mic Input : -70 dBm unbalance x 1 (M6 connector)
Audio Output :	-20 dBm or -60 dBm switchable (14-pin VTR connector)
Illumination Required :	1400 lux at F4.0
Minimum Illumination :	30 lux at F1.4 with +12 dB gain
Signal-to-Noise Ratio (Nominal) :	-52 dB (luminance) at 1400 lux, F4 without gamma and aperture correction
Horizontal Resolution (at center) :	570 lines
Geometric Distortion :	Less than 2%
Sweep Linearity :	Less than 2%
Registration :	Less than 0.1% within circle having a diameter 80% of picture height
	Less than 0.3% within circle having a diameter of picture height
	Less than 0.6% elsewhere
Vertical Enhancer :	2-line type
White Balance :	Automatic tracing white-balance (ATW), automatic white setting (AWC) with two memories or preset switchable
Black Balance :	Automatic with pulse canceller
Centering for Registration :	Automatic
Feedback (Automatic) Beam Control :	2F-stop (4 times)
Encoder :	Y.U.V.
Colour Bar :	Built-in EBU colour bar generator
Colour Conversion Filters :	3200°K, 5600°K with 12.5% ND, 5600°K, close
Maximum Cable Length :	VTR Cable : 30m (Power is not supplied through cable.)
	10m (Power is supplied through cable.)
	14-pin Studio Cable : 100m with cable compensator
Switches :	Power, Standby/Operate Selection, Colour Bar/Camera Selection, High Gain Selection, White Balance Selection, AWC Selection, Auto White/Auto Black Set, Auto Centering Set, Level Indicator ON/OFF, Fade, Fade Colour Selection, VTR Start/Stop, Tally ON/OFF, Rec Review, CHECK, VTR Selection, Negative/Positive Selection, VTR Compatibility, Audio Level Selection
Controls :	Total Pedestal
Lens Supplied :	10:1 auto iris power servo control zoom lens
	8mm - 80mm, F1.4, Micro function
Lens Iris :	Automatic or manual switchable
Lens Mount :	Bayonet mount for 1/2" pick-up tube
Lens Filter Size :	62mm P=0.75

Viewfinder :	1.5" (1-3/8" actual image size) electronic viewfinder with character display/CHECK function, zebra level indicator
Power Source :	12V DC five (5) ways such as; (1) Battery pack (2) AC adaptor (3) External DC through 4-pin external DC connector (4) VTR (external AC adaptor) (5) Remote control unit through RCU/gen-lock adaptor
Battery Pack Operating Time :	Approximately 1 hour with WV-PS60E Approximately 2 hours with WV-PS33E
Power Consumption :	Camera Head : 9.6 watts (12V DC, 0.8A) ENG Configuration : 12.6 watts (12V DC, 1.05A) Studio Configuration : 19.8 watts (12V DC, 1.65A)
Ambient Operating Temperature :	-10°C - +45°C
Ambient Operating Humidity :	30% - 90%
Dimensions :	Camera Head Only : 150(W) x 261(H) x 362(D) mm ENG Configuration : 233(W) x 261(H) x 488(D) mm (with WV-PS33E) Studio Configuration : 180(W) x 464(H) x 450(D) mm
Weight :	Camera Head Only : 2.7 kg ENG Configuration : 6.3 kg Studio Configuration : 8.1 kg

Weights and dimensions shown are approximate.
Specifications are subject to change without notice.

COMPOSITION

o ENG Colour Camera WV-V3E, WV-V3N

- o Camera Head WV-V3HE, WV-V3HN 1 set
- o 1.5" Electronic Viewfinder
WV-VF34E, WV-VF34N 1 set
- o 10:1 Auto Iris Power Servo Control
Zoom Lens WV-LZ33/10E 1 set
- o Unidirectional Electret Condenser
Microphone WV-MC34E 1 set
- o Carrying Case WV-CC35E, WV-CC35N 1 pc
- o Registration and White Balance Chart 1 pc
- o Colour Sheet 1 pc

o Colour Camera Head WV-V3HE, WV-V3HN

- o Camera Head WV-V3HE, WV-V3HN 1 set
- o Registration and White Balance Chart 1 pc
- o Colour Sheet 1 pc

o Main Optional Accessories

- o RCU/Gen-lock Adaptor WV-AD33E, WV-AD33N
- o RCU/Gen-lock Adaptor 1 set
- o Remote Control Unit (RCU) WV-RC33, WV-RC33N
- o Remote Control Unit (RCU) 1 set
- o 4-pin connector for Tally/Intercom 1 pc
- o 5" Electronic Viewfinder WV-VF65E
(Use for Studio Version)
- o 5" Electronic Viewfinder 1 set
- o Mounting Angle 1 set
- o Mounting Base 1 set
- o Tally Card 1 set
- o 1.5" Electronic Viewfinder WV-VF34E, WV-VF34N
- o 1.5" Electronic Viewfinder 1 set
- o 10:1 Servo Control Power Zoom Lens
WV-LZ33/10E
- o 10:1 Servo Control Power Zoom Lens 1 pc
- o 10:1 Servo Control Power Zoom Lens
WV-LZ32/10
- o 10:1 Servo Control Power Zoom Lens 1 pc
- o Lens Control Kit WV-LK32 for WV-LZ32/10
- o Zoom Remote Controller 1 pc
- o Focus Controller with Gear Box 1 pc
- o Unidirectional Electret Condenser Microphone
WV-MC34E
- o Unidirectional Electret Condenser
Microphone 1 pc

o Character Generator WV-KB12E, WV-KB12N

- o Character Generator 1 pc

o AC Adaptor/Charger WV-PS31, WV-PS31N for WV-PS60E and WV-PS33E

- o AC Adaptor/Charger 1 pc

o Battery Pack WV-PS60E

- o Battery Pack (1.65Ah) 1 pc

o Battery Pack WV-PS33E

- o Battery Pack (3.5Ah) 1 pc

o Charger DE-1232E, DE-1232N for WV-PS60E

- o Charger 1 pc

o Charger WV-BC30 for WV-PS33E

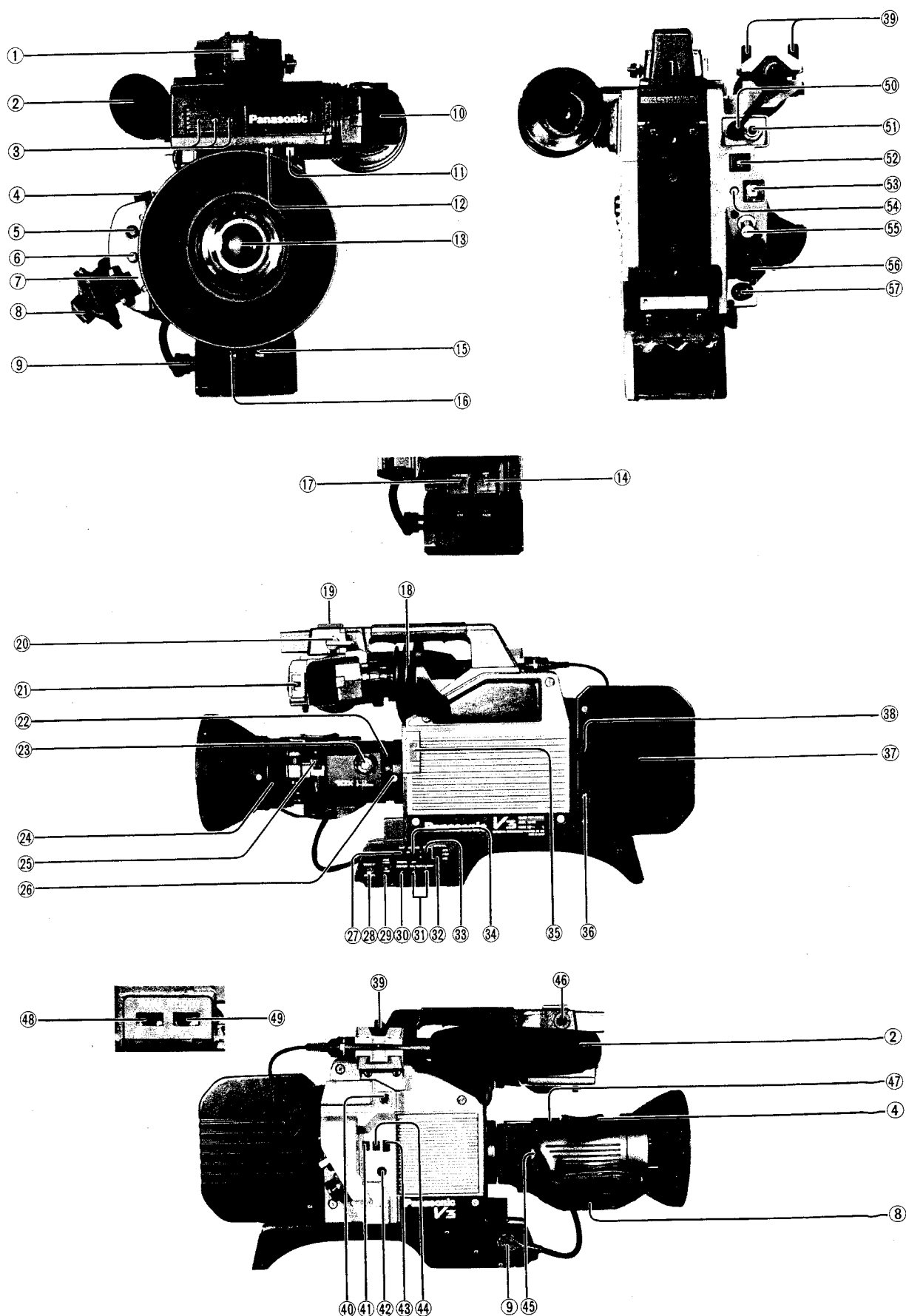
- o Charger 1 pc

o Other Optional Accessories

- o VTR Cable : WV-CA14/10 (14P-10P) 3 m
- WV-CA14/14 (14P-14P) 3 m
- o 10-Pin VTR Extension Cable : 10H-30AS 10 m
- 10H-50AS 15 m
- o 14-Pin VTR Extension Cable : 14H-30 10 m
- o Studio Cable : 14C-30 10 m
- o Studio Extension Cable : 14C-100 30 m
- o Lens Mount Adaptor for
2/3" Lens : WV-AD34
- o Tripod Mounting Adaptor : WV-Q36E
- o Chest Pad : WV-Q30E
- o Film/Slide Adaptor : WV-AD15BE, WV-AD15BN
- o Carrying Case : WV-CC35E, WV-CC35N

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

ENG Colour Camera System WV-V3E



ENG Colour Camera System WV-V3E, WV-V3N

- 1 **ATW (Automatic Tracing White-Balance) Sensor**
This sensor detects the characteristic/colour temperature of the light source and controls the gain of the red and blue signal individually and automatically for white balance setting when the White Balance Selection Switch (32) is set to the ATW position.
Note: Do not block the sensor during the automatic tracing white balance mode.

- 2 **Microphone**
This unidirectional monaural electret condenser microphone features extra sensitivity to sounds coming from a single direction. The output level of microphone is approximately -70 dB. It is connected to the Internal Microphone Connector (50) which supplies the power to the microphone.

- 3 **Tally Light (red)**
This tally light is illuminated when the unit is in full system operation with the remote control unit and special effects generator or is used with a Panasonic portable VTR.
The tally light informs the camera operator and others concerned that the camera is actually shooting the scene.

- 4 **Power Servo Zoom Control (W/T)**
The 10:1 power zoom lens can be controlled by pressing this control to zoom in/out for tele/wide pictures.

- 5 **Auto Iris Level Fine Control (FINE)**
Auto iris level can be fine-controlled by adjusting this control when the Iris Selection/Manual Control Knob (23) on the lens is pushed to the AUTO position.

- 6 **Auto Iris Level Preset Control**
The auto iris level can be preset/adjusted after removing the cap.

- 7 **Power Servo Zoom Unit**
This is a control unit for the power servo zoom of the lens.

- 8 **Hand Strap**
This hand strap is for holding the camera securely. The length of the strap is adjustable.

- 9 **Lens Connector (LENS)**
This connects the auto iris power servo control zoom lens which automatically adjusts the incoming light intensity by changing the lens iris.

- 10 **Electronic Viewfinder (Tiltable)**
This small 1.5" (1-3/8" actual image size) TV monitor shows exactly what the lens sees. The viewfinder is tiltable and can be adjusted up or down (approximately 90°) from horizontal. It can also be slid approximately 1-9/16" (40mm) laterally and 13/16" (20mm) back and forth.

- 11 **Contrast Control (CONTRAST)**
Turn this control clockwise to increase the picture contrast in the viewfinder.

- 12 **Brightness Control (BRIGHT)**
Turn this control clockwise to increase the picture brightness in the viewfinder.

- 13 **Auto Iris Power Servo Control Zoom Lens**
This is an 8-80mm lens for the 1/2" tube with automatic & manual iris control and power servo control zoom. It has a bayonet mount and F1.4 maximum aperture. The picture size can be magnified 10 times with use of the zoom feature. Just rotate the zoom/macro ring for close-up or wide angle. Enlarged close-ups with macro function can be made at a distance of up to 5cm (2 inch).

- 14 **Auto White/Auto Black Set Switch (AWC/HOLD/ABC)**

This switch sets the white balance and black balance automatically as follows;

AWC: For setting the white balance when the White Balance Selection Switch (32) is set to the AWC position. White balance setting will be necessary when WHITE, AWC 1 or AWC 2 blinks in the viewfinder. White balance for two different light sources such as indoor and outdoor can be set by setting the AWC Selection Switch (33) to AWC 1 or 2.

HOLD: This holds the white balance and black balance set at the AWC and ABC position for a long period of time.

ABC: For setting the black balance. Black balance setting is necessary when BLACK blinks in the viewfinder.

Note: Since the black balance at the 0 dB and +12 dB setting of the high gain selection switch is set alternately by selecting the 0 dB and +12 dB position automatically, the picture on the viewfinder and on the video monitor flashes while the black balance is being set.

15 Fade Button (FADE)

This button can be used to fade in or fade out recordings. When the button is pressed, the letter F is displayed in the viewfinder. The colour for the fade-in/out effect is selected by the Fade Colour Selection Switch (43).

16 VTR Start/Stop Button (VTR) (Parallel Operation)

This lock-release type switch is used to change the recorder mode from pause (Record/Pause) to record and functions as a VTR Start/Stop Button (45) on the lens. Push the button once and the recorder will start to record. REC blinks in the viewfinder and the Power Indicator (54) blinks. The Tally Light (3) on the viewfinder also lights during the recording.



Push the button again to place the recorder in pause (Record/Pause) mode. The blinking REC disappears, the Power Indicator will stop blinking and the Tally Light will go off.

Note : This button/switch is only operative when the VTR Start/Stop Button (45) on the lens is released (pause mode).

17 Auto Centering Set Switch (AUTO CENT)

This sets the horizontal and vertical centering of the red and blue picture to coincide with the green picture. Centering setting is necessary when CENT blinks in the viewfinder.

18 Eye Cap

This blocks out extraneous light. Rotate the eye cap for the optimum diopter setting.

19 Accessory Shoe

Used for mounting the Character Generator WV-KB12E, WV-KB12N or a light source.

20 Viewfinder Lock Lever

The viewfinder is locked and released by this lever.

21 Tally ON/OFF Switch (TALLY ON/OFF)

This switch turns ON/OFF the Tally Light (3) located on the front of the viewfinder.

22 Flangeback Adjusting Ring/Knob

Flangeback of the lens can be adjusted by rotating this ring/knob after loosening the knob.

23 Iris Selection/Manual Control Knob

Press this knob and the lens iris automatically adjusts to the light intensity. Pull and turn the knob to manually adjust the lens iris.

Note : This knob should be pushed to the AUTO mode when the camera is used with the remote control unit (RCU).

24 Focus Ring

Turning the ring located on the lens adjusts the focus. Focusing the lens of the camera alters the viewfinder picture. Bring the object into focus by adjusting the Focus Ring and observing the picture on the viewfinder.

25 Zoom Ring/Lever and Macro Knob

The picture size can be manually magnified 10 times with the use of this zoom ring/lever. Just rotate the zoom ring/lever for close-up (Tele) or wide angle (Wide) picture.

For close-up shooting, turn the zoom ring/lever to the macro range while pushing the macro knob. The camera can shoot objects as close as 5 cm (2").

CAUTION : (1) Do not zoom the lens in macro mode. The picture will go out of focus, because in macro mode the zoom ring/lever is used as a focus adjuster.

(2) Macro mode is automatically released when the lens is zoomed.

26 Lens Hold Ring/Knob

Turn this ring/knob clockwise to secure the lens tightly.

27 Colour Bar/Camera Selection Switch (BAR/CAMERA)

This switch selects the video output signal;

BAR : EBU colour bar is provided from the Video Output Connector (55) and 14-pin VTR connector (56).

CAMERA : The actual picture viewed by the lens is displayed.

Note : This switch is inoperable when the RCU is used.

28 Standby/Operate Selection Switch (STANDBY/OPERATE)

This switch selects the camera operation mode as follows;

STANDBY : The camera circuit is turned OFF to conserve the battery, except for the heating element of the pick-up tube and viewfinder CRT. The power indicator lights green.

OPERATE : The unit is in operating condition after necessary adjustments. The power indicator lights red.

Note : This switch should be set to the OPERATE position when the camera is used with the remote control unit (RCU).

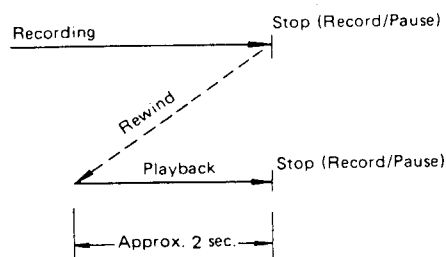
29 High Gain Selection Switch (GAIN +6dB/0/+12dB)

Normally set this switch to 0 dB position. Positions +6 dB and +12 dB increase the video output amplitude for dark scenes and are equivalent to opening the lens iris one or two F stops.

30 Rec Review Button (REC REV)

When this camera is operated with a Panasonic specified portable VTR such as the NV-180, this function operates and this button is only activated in the VTR's pause (Record/Pause) mode.

When this button is pressed after recording and the VTR is in pause mode, the VTR automatically rewinds the tape for quick review and plays back the tape for approximately 2 seconds to allow a visual check of the recording.



31 CHECK Button (CHECK 1-2, RESET)

The setting condition of the camera can be displayed in the viewfinder by CHECK 1 and 2 displays when the CHECK 1-2 button is pressed.

CHECK 1

CENT	OK
BLACK	OK
AWC 1	3200K
GAIN	0 DB

CHECK 2

LIGHT	OK
SYSTEM	10P
RUN	PLUS
AUDIO	-60DB

The CHECK display disappears from the viewfinder when the CHECK RESET button is pressed.

Note : The CHECK display disappears from the viewfinder when the automatic white balance, black balance or centering setting are activated.

32 White Balance Selection Switch (WHITE BAL, ATW/P SET/AWC)

This switch selects white balance mode as follows;

ATW : The white balance is automatically set by detecting the characteristic/colour temperature of light source with the ATW sensor (1) and controls the gain of red and blue signal even if the characteristic/colour temperature changes.

Note : (1) The Filter wheel (35) must be set to position 1 in this operation.

(2) If the camera is used with the lens other than WV-LZ33/10E outdoor in the ATW position, the lens iris may hunt continuously. In this case, the ND filter which reduces the light intensity more than 1/8 should be mounted on the lens.

P SET : Proper white balance is reproduced when the camera is aimed at an object illuminated by 3200°K colour temperature light and the Filter Wheel (35) is set to position 1.

AWC : The white balance can be set automatically by the Auto White/Auto Black Set Switch (14). The white balance for two different light sources such as indoor and outdoor can be set by setting the AWC Selection Switch (33) to AWC 1 or 2.

Note :

1. It is recommended to use the ATW position if quick setting up is required or the characteristic/colour temperature of light would vary during shooting.
2. It is recommended to use the AWC position if the characteristic/colour temperature of scene does not vary.
3. This switch is inoperable when the RCU is used.

33 AWC Selection Switch (AWC 1/2)

The white balance for two different light sources such as indoor and outdoor can be set by selecting this switch to AWC 1 or 2 when the White Balance Selection Switch (32) is in the AWC position.

34 Level Indicator ON/OFF Switch (LEVEL IND ON/OFF)

When this switch is set to the ON position, pictures which exceed the specified level (0.7Vp-p) produce a zebra pattern in the viewfinder.

When the background is bright and the object appears too dark in automatic iris control mode, adjust the lens iris in the manual iris control mode so that the object in the viewfinder is almost developing a zebra pattern. In this case the background may become overexposed.

Set this switch to the OFF position in the automatic iris control mode.

35 Filter Wheel

To set the filter wheel, flip-open the cover.

The filter wheel is a four-position wheel which has two built-in colour temperature conversion filters and one ND filter.

	CHECK display
(1) 3200°K - indoor light	3200K
(2) 5600°K	
+12.5% ND - daylight (sunny)	56 ND
(3) 5600°K - daylight (cloudy/rainy)	5600K
(4) Close	CLOSE

Select the position according to the light source.

The position of filter wheel is displayed in the viewfinder in CHECK operation.

Note : The filter wheel must be set to the position 1 in the automatic tracing white-balance (ATW) operation.

36 Charge Connector for Battery Pack WV-PS33E

The charging cord from the battery charger is connected to this connector.

37 Battery Pack WV-PS33E

The battery pack WV-PS33E is mounted on the camera and provides power for approximately 2 hours.

38 Battery Pack Release Button

When removing the battery pack, lift it up while pressing this button.

39 Microphone Holding Knob

To secure the microphone, turn this knob clockwise.

40 Audio Monitoring Jack (M3) (AUDIO MONITOR)

When the earphone is connected, the sound of the Internal Microphone Connector (50) or the External Microphone Connector (51) can be monitored.

41 VTR Selection Switch (VTR 10P/14P)

This switch selects the type of VTR connected to the 14-Pin VTR Connector (56).

10P : Panasonic portable VTR with 10-pin camera connector such as NV-180 is connected to the VTR connector using the VTR cable WV-CA14/10.

14P : Portable VTR with 14-pin camera connector may be connected to the VTR connector using the VTR cable WV-CA14/14.

Note : (1) Set this switch correctly before turning ON the Power Switch (53).
(2) If this switch is set incorrectly, the camera may not function properly.

42 Total Pedestal Control (TOTAL PED)

This control can adjust the pedestal level of video signal (luminance) for matching the pedestal level of more than two cameras in the system. Use a waveform monitor or oscilloscope for precise adjustment.

Note : It is operable even when the RCU is used.

43 Fade Colour Selection Switch (FADE WHITE/BLACK/EXT)

This switch selects the colour for fade-in/out effect as follows;

WHITE : The picture fades in(out) from(to) white.

BLACK : The picture fades in(out) from(to) black.

EXT : The picture fades in(out) from(to) one of seven colours selected by the character generator WV-KB12E. Selectable colours are white, cyan, yellow, magenta, blue, red or green.

44 Negative/Positive Selection Switch (NEGA/POS)

When this switch is set to the NEGA position, the normal (positive) picture is converted into a negative picture.

45 VTR Start/Stop Button (VTR) (Parallel Operation)

This is a lock-release type switch which is used to change the recorder from pause (Record/Pause) to record as well as a VTR Start/Stop Button (16) on the camera. Push the button once and the recorder will start to record as shown by REC blinking in the viewfinder and the blinking power indicator (54). The Tally Light (3) on the viewfinder also lights during the recording.

Push the button again and the recorder enters pause (Record/Pause) mode, and REC will disappear, the Power Indicator will stop blinking and the Tally Light will go off.

Note : This button is only operative when the VTR Start/Stop Button (16) on the camera is released (pause mode).

46 Title Connector (TITLE)

The character generator WV-KB12E, WV-KB12N is connected to this connector.

47 Return Video Button (RET)

When portable VTR with 14-pin camera input connector is used, the recording and playback picture may be seen by pressing this button.

When an auxiliary signal such as lineview signal from a special effects generator is supplied to the auxiliary connector of the remote control unit (RCU) during system operation, the lineview signal is displayed on the viewfinder while this button is being pressed.

48 VTR Compatibility Switch (RUN ⊕/⊖)

The logic level of the camera trigger for different VTRs may be incompatible and reversed, so that the VTR pauses when it should run and vice versa. In this case, operate this switch to reverse the trigger polarity. It is factory-set to the ⊕ position.

49 Audio Level Selection Switch (AUDIO L -20dB/-60dB)

Two audio output levels for the VTR can be selected : -20dB or -60dB. It is factory-set to the -20dB position.

50 Internal Microphone Connector (M3) (MIC INT)

The internal microphone (2) mounted on the camera is connected to this connector. The connector supplies power to the microphone.

51 External Microphone Connector (M6) (MIC EXT)

An external microphone with output level of approximately -70dB can be connected to this M6 connector.

When an external microphone is connected, the internal microphone is mechanically disconnected.

52 Battery Connector (BATTERY)

This battery connector is for connecting the battery pack.

53 Power Switch (POWER BATT, OFF, VTR/RCU)

This switch turns ON the power of the camera as follows;

EXT/BATT/AC ADP : This position is used for external DC, battery pack or AC adaptor.

OFF : The power is OFF.

VTR/RCU :

This switch is used for selecting the power source from VTR (operated by AC adaptor) or the remote control unit (RCU) via the RCU/gen-lock adaptor.

54 Power Indicator (POWER)

This indicator lights red when the camera is in operating condition. If the VTR Start/Stop Button is pressed in the operating condition, this indicator blinks to indicate the recording mode. When the camera is in the standby mode, the indicator lights green.

55 Video Output Connector (BNC) (VIDEO OUT)

A composite video signal is provided at this connector.

56 14-Pin VTR Connector (VTR)

When used in conjunction with a Panasonic portable VTR, the following VTR cable is connected between the camera and VTR.

The VTR Selection Switch (41) should be set according to the VTR connected to this connector.

Portable VTR with 10-pin camera connector, such as Panasonic NV-180 :

VTR cable WV-CA14/10

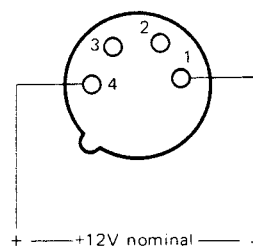
Portable VTR with 14-pin camera connector :

VTR cable WV-CA14/14

57 4-Pin External DC Input Connector (EXT DC)

This connector is used for connecting a cable from an external DC nominal 12V 1.1A power source (a belt type battery or a car battery for example).

This connector is also used for connecting a cable from an AC adaptor.



CIRCUIT DESCRIPTION FOR WV-V3

1. Outline

Incoming light which contains red (R), green (G) and blue (B) light enters a dichroic prism through a zoom lens and separated into the R, G and B light respectively. The separated R, G and B light go to the respective pick-up tubes and converted into the video signal whose level corresponds to the incoming light intensity. The video signals from the pick-up tubes are then sent to the Pre-preamplifier and Preamplifier circuit and the video signals are amplified to the necessary level.

The amplified R, G and B signals are supplied to the dark shading correction circuit in the Process-1 board where their dark shading is corrected and the gain of R, G and B signal is controlled by setting the High Gain Selection Switch. The dark shading correction signal is generated in the shading signal circuit. In the dark shading correction circuit, the gain of R and B signal are controlled automatically by the DC voltages from the Auto board to match them with that of G signal. In this way, the white balance is set automatically.

The R, G and B signals are fed to the signal processing circuit where these signals undergo the gamma correction to correct non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and to produce a linear picture of high fidelity. These signals also receive low level clip for setting the pedestal level and high level clip to clip excessively high level. In the signal processing circuit, the pedestal level of R and B signal are controlled automatically by the DC voltages from the Auto board to match them with that of G signal for the black balance. The R, G and B signal from the signal processing circuit are sent to the AIC NAM control circuit in the Deflection board and the highest signal among them is detected. The NAM signal is used to control the lens iris corresponding to the incoming light intensity. The NAM signal is also sent to the level indicator drive circuit to generate the signal to indicate the signal level on the viewfinder. The g signal from the G dark shading correction/gain control circuit in the Process board is fed to the vertical (V) detail signal generator circuit and the horizontal (H) detail signal generator circuit in the Process board. The H detail signal and V detail signal thus generated are mixed together, fed through the detail out circuit to R, G and B signal processing circuit in the Process board, and added to the R, G and B signal to enhance the horizontal and vertical resolution. The G signal is fed to the vertical delay circuit to delay the G signal in order to match the G signal with the detail signal in phase.

The R, G and B signal are then supplied to the camera/bar select circuit.

The R, G and B color bar signal are also sent to the select circuit from the color bar circuit.

These signal is selected by setting the color bar/camera selection switch and sent to the U, V and luminance (Y) matrix circuit respectively. U and V signal are then sent to the balance modulator circuit to generate the chrominance signal. The chrominance signal is sent to the PAL output circuit where it is mixed with the Y signal to make an PAL signal. The PAL signal is sent to other system product through a video output connector. The R, G, B and Y signal are fed to the PIX select circuit. In the PIX select circuit, R-G or B-G signal is selected for the registration adjustment and sent to the video output connector.

The R, G and B signal are sent to the auto white control circuit, auto black control circuit and auto centering comparison circuit respectively. In the auto white control circuit, the R and B signal level are compared with the reference G signal and the difference in comparison is sent to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B dark shading correction/gain control circuit to control the gain of the R and B signal to match them with the G signal level. In this way, the white balance is automatically set.

Similarly, the dark level of R and B signal are compared with that of G signal in the auto black control circuit. The resultant in comparison is fed to microprocessor. The microprocessor sends the DC voltages through the auto control output circuit to the R and B signal processing circuit in order to match the black level of R and B signal with that of G signal automatically.

In the auto centering compensation circuit, the centering (registration) of R and B signal are compared with that of G signal. The difference in comparison is fed through the auto centering control circuit to the microprocessor. The microprocessor sends the DC voltages through the auto control output circuit and the Deflection board to the deflection coil for the R and G pick-up tube in order to control the centering of R and B signal for matching them with the G signal.

In this way, the centering is set automatically.

When the auto white, auto black or/and auto centering setting fails, the microprocessor sends the warning signal to the viewfinder.

The R and B DC voltage are sent from the ATW sensor through the ATW control board to the comparator in VIC 2 on the Mother board. The DC voltage of R and B gain control signal are sent from the microprocessor to the comparator in VIC 2 and they are compared. The compared DC voltage of R and B signal are sent through microprocessor to the R and B dark shading correction/gain control circuit to control the gain of the R and B signal to match them with the G signal level. In this way, the white balance is automatically traced.

The 14MHz frequency oscillated by the internal 14MHz oscillator circuit is fed to the sync generator IC which generates the necessary signals/pulses.

The subcarrier (SC) signal is sent through the SC out circuit through the sync generator circuit.

The horizontal deflection circuit generates the sawtooth current from the Hs pulse for the horizontal(H) beam deflection inside the pick-up tubes and sends to the H deflection coils for the R, G and B pick-up tubes. The flyback pulse generated in the horizontal deflection circuit is converted into parabola signals in the horizontal linearity circuit and these signals are also fed to the H deflection coil for the linear H beam deflection. The vertical scanning start(Vs) pulse is supplied to the V sawtooth generator circuit and converted into a vertical(V) sawtooth signal. The V sawtooth signal is then fed to the vertical deflection circuit and vertical linearity circuit. The V sawtooth signal is converted into a V parabola signal in the vertical linearity circuit and fed to the vertical deflection circuit too. In the vertical deflection circuit, the V sawtooth signal for V deflection and V parabola signal for V linearity correction are mixed and amplified. The mixed signal is then sent to the V deflection coil for the R, G and B pick-up tubes. The skew circuit sends the V sawtooth signal to the horizontal deflection circuit through the centering/skew output circuit together with automatic or manual centering DC voltages for the registration among the R, G and B pick-up tubes. Target voltage circuit produces target Esj voltage from high voltage and sends them to the electrodes of R, G and B pick-up tubes. The target protection circuit receives the H deflection and V deflection signal and converts into the DC potential. The DC potential is sent to the high voltage circuit in the High voltage board for the target protection of pick-up tubes.

The high voltage circuit generates the DC voltages for the pick-up tubes using a DC DC converter. The DC potential is fed to the high voltage circuit from the target protection circuit for the target protection. In the normal operating condition, the high potential is fed to the high voltage circuit and the high voltages are generated. However, the H or/and V deflection circuit fails, the low level is fed to the high voltage circuit and it stops generating the high voltages. In this way, the target of pick-up tubes are protected. The feedback beam control circuit receives the R, G and B signals from the R, G and B dark shading correction/gain control circuit respectively.

The R, G and B signals are positively fed back to the grid-1(G1) of related pick-up tube for setting the beam current to optimum level automatically corresponding to the intensity of the scene. The horizontal scanning start (Hs) pulse and the vertical scanning start (Vs) pulse are fed to the cathode blanking circuit where they are mixed and the composite cathode blanking pulse is made. It is then fed to the cathode of R, G and B pick-up tubes. The AIC control circuit receives the NAM signal corresponding to the incoming light intensity and controls the lens iris.

2. Optics System

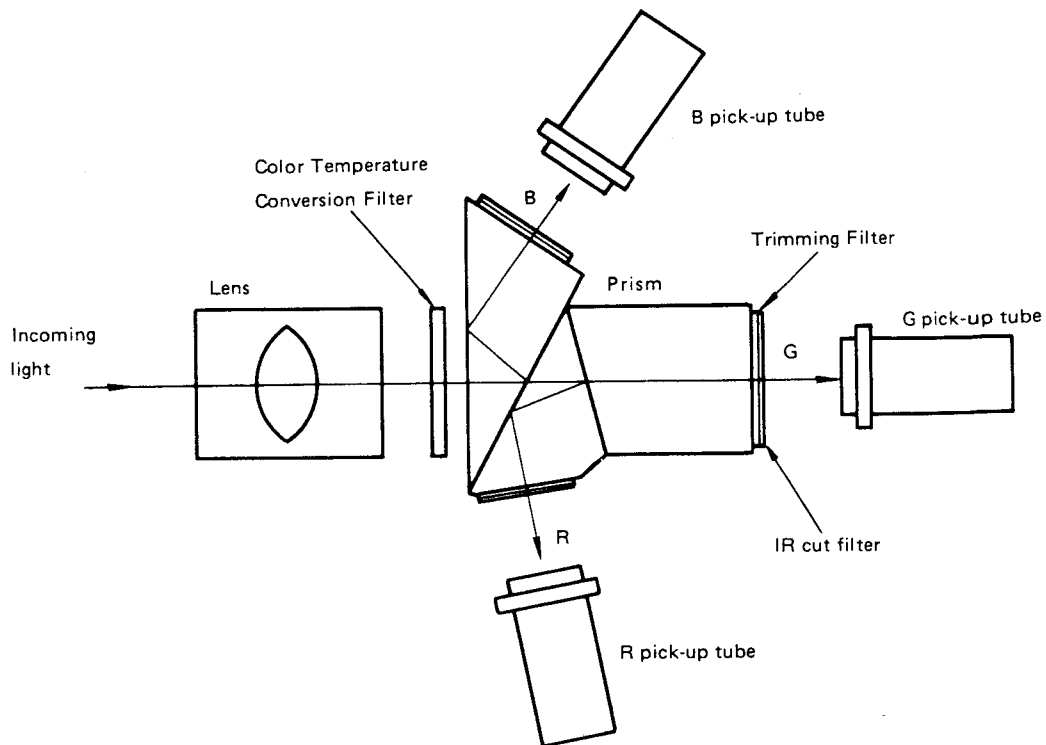


Fig. 2-1 Optics System

Outline

The optics system using a dichroic prism separates the incoming light into three primary color lights, red, green and blue. The separated light enters corresponding pick-up tube respectively to convert it into the video signal.

Details

The incoming light which contains the red (R), green (G) and blue (B) information enters the dichroic prism through a zoom lens and a color temperature conversion filter.

• Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from $380\text{ m}\mu$ ($\text{m}\mu=\text{nm}$) to $780\text{ m}\mu$ in wavelength (the visible region). In addition, the eye also discerns the wavelength difference as a color difference, seeing light between $400\text{ m}\mu$ to $500\text{ m}\mu$ wavelength as predominantly blue information, the light between $500\text{ m}\mu$ to $600\text{ m}\mu$ as green information, and the light between $600\text{ m}\mu$ to $700\text{ m}\mu$ as red information. The entire light in the visible range of wavelength from $380\text{ m}\mu$ to $780\text{ m}\mu$ is seen as different amount of white light.

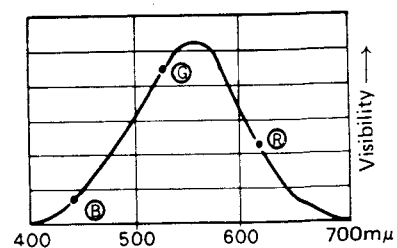


Fig. 2-2 Standard Luminosity Curve

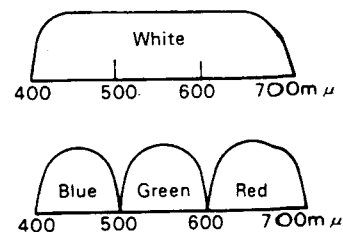


Fig. 2-3 The Visible Spectrum

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be referred to a light emitted from the burning carbon used as a standard. A light source of 3200°K ($\text{K}=\text{Kelvin}$: -273°C corresponds to 0°K an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K (2927°C). The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 2-4. The color temperature goes up as the weather turns rainy from clear. This may be related to the burning carbon (charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.

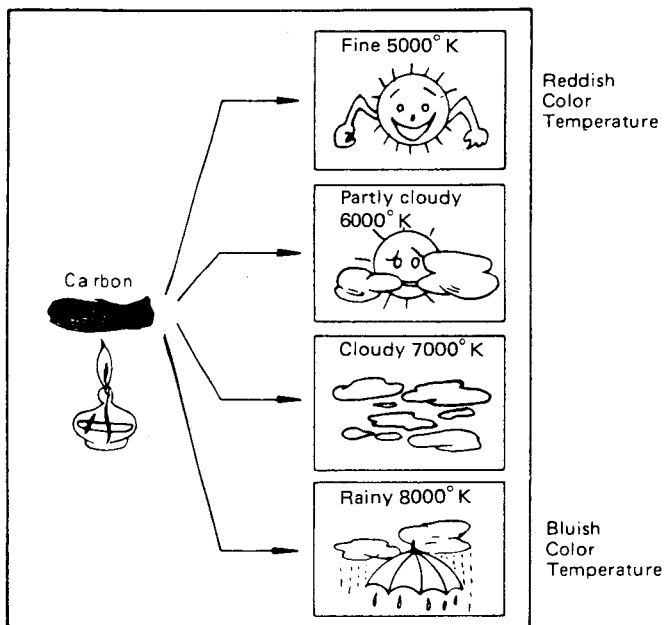


Fig. 2-4 Color Temperature and Weather Conditions

When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture. When the color camera is pointed at an object illuminated by a light of high color temperature, it produces a bluish picture. This camera is designed to be used under the light whose color temperature is 3200°K , and it has the 4-position color temperature conversion filter wheel which converts the color temperature of incoming light to 3200°K . When the filter wheel is set to the position 1, the transparent filter is inserted into the light path. When it is set to the position 2, the 5600°K color temperature conversion filter is

inserted into the light path and the 5600°K light is converted to the 3200°K light. When it is set to position 3, the 5600°K color temperature conversion filter with $1/8$ neutral density (ND) filter is inserted into the light path and the 5600°K light is converted to the 3200°K light. The position 3 is used for fine day outdoor. The position 4 is for closing the lens. In addition to the color temperature conversion filter wheel, this camera is so designed that the level of red and blue signals can be set automatically or to match the color temperature of the light source which illuminates the object in order to ensure proper color reproduction.

The blue (B) light is reflected at the boundary face between the 1st and 2nd prism and the surface of 1st prism, and enters to the B pick-up tube through the trimming filter and infrared (IR) cut filter. The red (R) and green (G) lights pass through the boundary between 1st and 2nd prism.

• Trimming Filter

The boundary face between the 1st and 2nd prism also reflects a little red and green light, not only blue light. The trimming filter passes only the blue light and prevents the red and green light going to the blue pick-up tube.

• Infrared (IR) Cut Filter

As shown in Fig. 2-5, the pick-up tube has some sensitivity in the infrared region beyond the visible range. The infrared (IR) cut filter cuts off the infrared light rays which the human eye does not see as light. If the color signal is made by using the video signal corresponding to the infrared rays which the human eye can not normally see, the colors of pictures on the monitor and that seen with the naked eye would differ substantially.

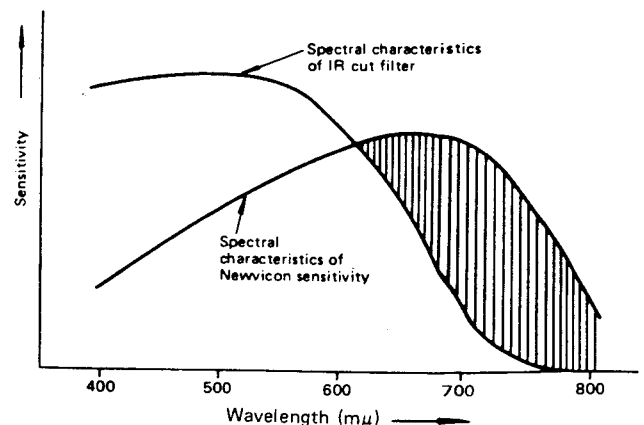


Fig. 2-5 IR Cut Filter Response

o Pick-up Tube

The 1/2 inch scan NEWVICON® tubes are used in this camera as pick-up tubes. The NEWVICON® tube has following features in comparison with the vidicon tube.

1. Higher sensitivity
2. Higher resistance against burning
3. Less lag
4. Less dark current/shading

The red(R) and green (G) lights reach on the boundary between the 2nd and 3rd prism and only the R light reflects. The reflected R light is again reflected by the boundary between the 1st and 2nd prism, and enters to the R pick-up tube through the trimming filter and the IR cut filter as in the case of the B light.

The remaining green (G) light which passes through the boundary between the 2nd and 3rd prism goes to the G pick-up tube through the trimming filter and the IR cut filter as in the case of the B and R lights.

3. Pre-Preamplifier and Preamplifier Board

The video current from the green (G) pick-up tube is supplied to the target terminal of the Pre-preamplifier board and converted into a video signal by R1. This video signal is amplified by Q1 and fed to the Pre-amplifier board. The signal from the Pre-preamplifier board is amplified by Q1, Q2, Q3 and Q4 in the Pre-amplifier board and sent to the Process board through terminal 4 of CN8. The negative feedback signal is taken from the emitter of Q4 and returned to the gate of Q1 in Pre-preamplifier board through the feedback circuit consisting of R10, C3, C4 and R2. CT1 (FREQUENCY RESPONSE) adjusts the frequency response of the feedback signal and corrects the overall frequency response of the amplifier. The target voltage is supplied through terminal 3 of CN8 and R1 to the target of pick-up tube. The red and blue signals from the corresponding pick-up tube are amplified and sent to the Process board as in the case of the green signal.

4. Process Board

The Process board contains following circuits.

4-1	+1.8V/+3.6V DC Regulator Circuit	18
4-2	Shading Processing Circuit	19
4-3	G Signal Processing Circuit	19
4-4	R Signal Processing Circuit	21
4-5	B Signal Processing Circuit	23
4-6	Color Bar Circuit	24
4-7	Camera/Bar Select Circuit	24
4-8	U Matrix Circuit	25
4-9	V Matrix Circuit	25
4-10	Balance Modulator Circuit	25
4-11	Y Matrix Circuit	25
4-12	NEGA/POSI Control Circuit	26
4-13	Zebra Control Circuit	27
4-14	PIX Out Circuit	28
4-15	EXT Title Circuit	28
4-16	Video Output Circuit	30
4-17	2H V. Detail Signal Generator Circuit	30
4-18	H. Detail Signal Generator Circuit	31
4-19	Detail Out Circuit	32

4-1 +1.8V/+3.6V DC Regulator Circuit

The +1.8V and +3.6V DC are generated by regulating +8.6V DC power with IC1. The reference voltage for +1.8V DC is obtained by dividing the +8.6V DC using R68 - R71 and obtained at a crosspoint of R69 and R70.

The output voltage at pin 1 of IC1(a) is fed back to pin 2 of IC1(a) for stabilizing the +1.8V DC. The reference voltage for +3.6V DC is obtained at a crosspoint of R70 and R71, and the output at pin 7 of IC1(b) is fed back to pin 6 for stabilizing the +3.6V DC. The +1.8V and +3.6V DC are supplied to the G, R and B signal processing circuit as reference voltages.

+1.2V DC obtained at a crosspoint of R68 and R69 is also fed to the G, R and B signal processing circuit.

4-2 Shading Signal Circuit

o B Shading Signal Circuit

The V sawtooth and parabola signals, and the H sawtooth and parabola signals are routed to the wiper arms of blue dark shading correction controls VR9 (B V. SAWTOOTH), VR10 (B V.PARABOLA), VR11 (B H.SAWTOOTH) and VR12 (B H.PARABOLA) in VIC4. These signals are supplied to both the base and emitter of mixer Q3 in VIC4, where they are mixed. The positive or negative blue dark shading correction signal is obtained at the collector of Q3 depending upon the position of these controls and it is sent to pin 5 of analog switch IC1 in VIC4. Analog switch IC1 is controlled by the positive horizontal (H) pulse fed to the control terminal (pin 11) of IC1. During the negative portion of H pulse, pins 4 and 5 of IC1 are connected and the dark shading correction signal is fed through buffer Q6 in VIC4 to the B signal processing circuit. During the positive portion of H pulse, pins 3 and 4 of IC1 are connected and the DC voltage set by VR14 (B BLANKING OFFSET) in VIC4 is fed to the B signal processing circuit to equalize the blanking level and dark signal level.

o G Shading Signal Circuit

The G dark shading correction signal is made as in the case of B dark shading correction signal.

The V sawtooth and parabola signals and the H sawtooth and parabola signals are fed to the wiper arms of green dark shading correction controls VR1 (G V. SAWTOOTH), VR2 (G V.PARABOLA), VR3 (G H. SAWTOOTH) and VR4 (G H.PARABOLA). These signals are sent to both the base and emitter of mixer Q1 in VIC4, where they are mixed. The positive or negative green dark shading correction signal is obtained at the collector of Q1 depending upon the position of these controls and it is supplied to pin 2 of analog switch IC1 in VIC4. IC1 is controlled by the positive H pulse sent to the control terminal (pin 10) of IC1. During the negative portion of H pulse, pins 2 and 15 of IC1 are connected and the dark shading correction signal is fed through buffer Q7 to the G signal processing circuit. Pins 1 and 15 of IC1 are connected during the positive portion of H pulse and the DC voltage set by VR13 (G BLANKING OFFSET) in VIC4 is sent to the G signal processing circuit to equalize the blanking and dark signal level.

o R Shading Signal Circuit

The R dark shading correction signal is made as in the case of B and G dark shading correction signal.

The V sawtooth and parabola signals and the H sawtooth and parabola signals are fed to the wiper arms of red dark shading correction controls VR5 (R V. SAWTOOTH), VR6 (R V.PARABOLA), VR7 (R H. SAWTOOTH) and VR8 (R H.PARABOLA) in VIC4. These signals are sent to both the base and emitter of mixer Q2 in VIC4, where they are mixed. The positive or negative green dark shading correction signal is obtained at the collector of Q2 depending upon the position of these controls and it is supplied to pin 12 of analog switch IC1 in VIC4. IC1 is controlled by the positive H pulse sent to the control terminal (pin 11) of IC1. During the negative portion of H pulse, pins 12 and 14 of IC1 are connected and the dark shading correction signal is fed through buffer Q8 to the R signal processing circuit. Pins 13 and 14 of IC1 are connected during the positive portion of H pulse and the DC voltage set by VR15 (R BLANKING OFFSET) in VIC4 is sent to the R signal processing to equalize the blanking and dark signal level.

4-3 G Signal Processing Circuit

4-3-1 Dark Shading Correction Circuit

The green (G) signal (A) is supplied through pin 3 of CN8, pin 2 of VIC1, buffer Q1 and VR1 (G INPUT GAIN) in VIC1 to emitter of shading correction/amplifier Q2 in VIC1. The G dark shading correction signal (B) is sent from the G shading signal circuit to the emitter of Q2 where it is mixed with the G signal (A) for correcting the dark shading. The G signal (C) which undergoes the dark shading correction and is amplified by Q2 is sent to buffer Q4 in VIC1. The positive horizontal (H) pulse (D) is fed to blanking cleaner Q3 in VIC1 to eliminate the noise during the blanking period. The G signal at the emitter of Q4 is fed to clamp circuit Q5 in VIC1 where the G signal is clamped by the clamp (CP) pulse (CP) supplied to the base of Q5. The clamped G signal is then sent through buffer Q6 in VIC1 and to pin 2 of amplifier IC1 in the gain control circuit. The G signal obtained at the emitter of Q6 is fed through pin 7 of VIC1 and pin 11 of CN1 to the feedback beam control circuit in the Deflection board.

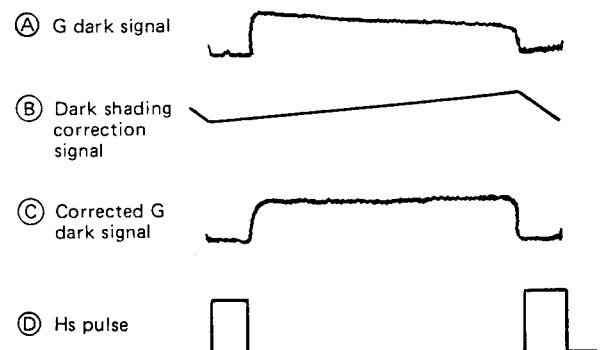


Fig. 4-3-1 Dark Shading Correction

4-3-2 Gain Control Circuit

The G signal is supplied from the dark shading correction circuit to pin 2 of amplifier IC1. The gain of IC1 is controlled by the fixed DC voltage set by R19 and R20, and supplied to pin 10 of IC1.

The amplified G signal obtained at pin 12 of IC1 is fed through buffer Q7 to clamp circuit Q8 in VIC1 where the G signal is clamped by the CP pulse supplied to the base of Q8. The clamped G signal is then sent through amplifier Q9 and Q10 in VIC1 to high gain control circuit consisting of Q1 and Q2. When the High Gain Selection Switch SW8 on the side of camera is selected to 0dB, +6dB or +12dB position, the DC potential supplied to cross-point of R1 and R2, R4 and R6 through pins 5 and 7 of CN3 becomes high (H) level or low (L) level and Q1 and Q2 work as shown in the Table below.

Position of High Gain Selection Switch	Q10	Q11
0dB	OFF	OFF
+6dB	OFF	ON
+12dB	ON	OFF

As a result, the gain of Q12 in VIC1 becomes minimum in the 0dB position of SW8 in the +6dB position, the gain of Q12 becomes double of that in the 0dB position. In the +12dB position, the gain of Q12 becomes four times of that in the 0dB position.

The G signal thus controlled its gain is then fed to the Signal Processing Circuit.

4-3-3 Signal Processing Circuit

The G signal (A) is supplied from the Gain Control Circuit to clamp circuit Q13 in VIC1 where the blanking level of G signal is clamped by the clamp pulse (CP) fed to the base of Q13 and the blanking level is set to the DC voltage at the emitter of Q13. The G signal (B) whose blanking potential is set is sent through buffer Q14 in VIC1 to preblanking mixer Q15 in VIC1 where the preblanking (pre BL) pulse (C) fed to the base of Q15 is mixed with the G signal (B). The mixed G signal (D) is forwarded through buffer Q16 and amplifier Q17/Q18 in VIC1 to black clip Q19/Q23 in VIC1 where low level of G signal (D) is clipped. As a result, the G signal whose pedestal is set is made (E).

VR3 (G PEDESTAL) in VIC1 sets the pedestal level of the G signal by changing the clamp potential. The G signal whose pedestal is set is then fed to the gamma correction circuit.

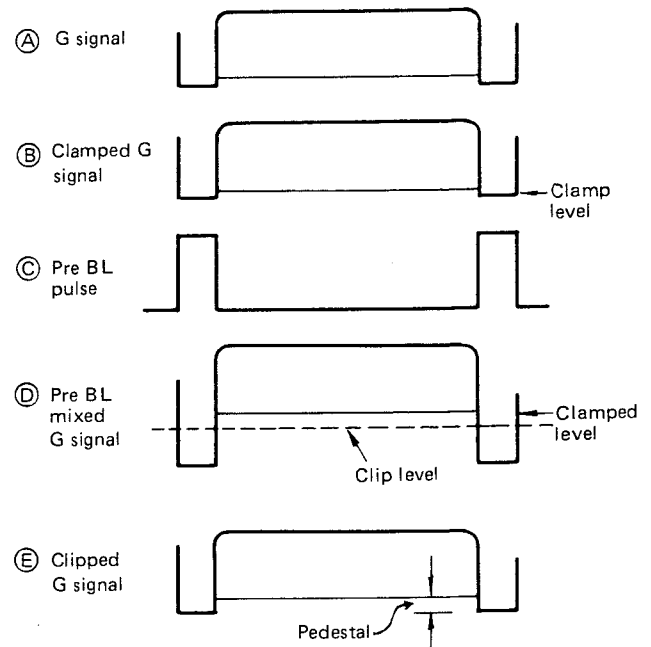


Fig. 4-3-2 Pedestal Setting

4-3-4 Gamma Correction Circuit

The G signal undergoes the low level clip and obtained at the emitter of black clip Q19/Q23 in VIC1 is fed through R42 in VIC1 to signal suppression circuit consisting of Q3 - Q5 where the G signal is suppressed as shown in Fig. 4-3-3. The suppression levels are set by the DC voltages fed to the base of Q3 - Q5 from Q27. Q3 suppresses relatively low level of G signal, Q4 is for middle portion and Q5 is for relatively high level.

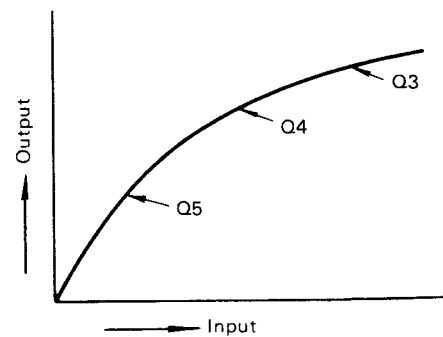


Fig. 4-3-3 G Gamma Correction-1

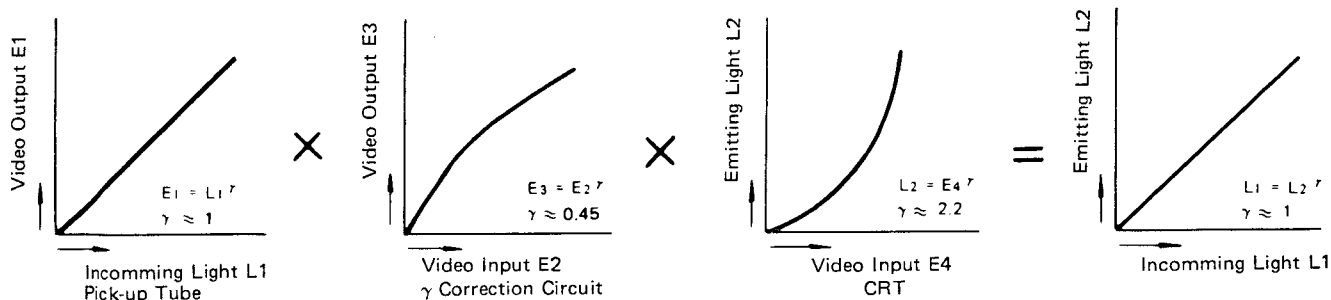


Fig. 4-3-5 Gamma Correction

The suppressed G signal is supplied through buffer Q21 to VR3 (G GAMMA) in VIC1 where it is mixed with non-suppressed G signal fed through buffer Q22 in VIC1. The gamma characteristic can be adjusted by setting VR3 as shown in Fig. 4-3-4.

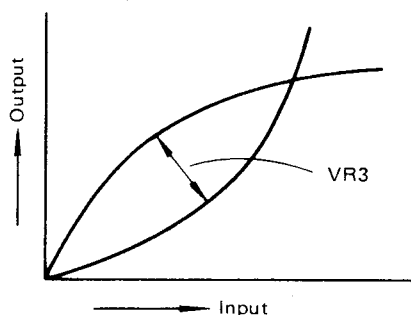


Fig. 4-3-4 G Gamma Correction-2

Q24 in VIC1 is used for feeding bias to Q22 in order to match bias at base of Q21. The G signal at the emitter of Q19 is sent to the AIC NAM control circuit through Q20 in VIC1 which is a part of NAM circuit.

The gamma-corrected G signal obtained at center arm of VR3 is fed to white clip Q25 in VIC1 where the high level of G signal is clipped by DC voltage set by VR6 (G WHITE CLIP) and fed to the base of Q25. The G signal is then fed through buffer Q26 and pin 19 of VIC1 to the 2H Modulation circuit and 1H delayed G signal is supplied from the 2H Modulation circuit to the G signal output circuit.

The delayed G signal is fed through buffer Q6 to the emitter of detail mix amplifier Q7 where it is mixed with the horizontal and vertical detail signal which is supplied from the detail output circuit to the base of Q7. The delayed G signal mixed with the detail signal and obtained at the collector of Q7 is fed through G output Q8 to the Encoder circuit and Auto (A) board. VR1 (G GAIN) adjusts the G signal level.

4-4 R Signal Processing Circuit

4-4-1 Dark Shading Correction Circuit

This circuit is same as that for the G signal. Refer to the circuit description of G dark shading correction circuit. The red(R) signal is supplied through pin 4 of CN9, pin 2 of VIC2, buffer Q1 and VR1 (R INPUT GAIN) in VIC2 to emitter of shading correction/amplifier Q2 in VIC2. The R dark shading correction signal is sent from the R shading signal circuit to the emitter of Q2 where it is mixed with the R signal for correcting the dark shading. The R signal which undergoes the dark shading correction and is amplified by Q2 is sent to buffer Q4. The positive horizontal (H) pulse is fed to blanking cleaner Q3 in VIC2 to eliminate the noise during the blanking period.

The R signal at the emitter of Q4 is fed to clamp circuit Q5 in VIC2 where the R signal is clamped by the clamp pulse (CP) supplied to the base of Q5. The clamped R signal is then sent through buffer Q6 in VIC1 and to pin 2 of amplifier IC1 in the gain control circuit.

The R signal obtained at the emitter of Q6 is fed through pin 9 of CN2 to the feedback beam control circuit in the Deflection board.

4-4-2 Gain Control Circuit

The R signal is supplied from the dark shading correction circuit to pin 2 of amplifier IC1 in VIC2 which is a part of automatic white balance setting loop to match the R signal to the G signal in level by changing the gain of IC1. The gain of IC1 is controlled by the DC voltage supplied to pin 10 of IC1 from the Auto (C) board through pin 24 of CN1 and pin 9 of VIC2.

The amplified R signal obtained at pin 12 of IC1 is fed through buffer Q7 to clamp circuit Q8 in VIC2 where the R signal is clamped the CP pulse supplied to the base of Q8. The clamped R signal is then sent through amplifier Q9, Q10 and Q11 in VIC2 to high gain control circuit consisting of Q10 and Q11. When the High Gain Selection Switch SW8 on the side of camera is selected to 0dB, +6dB or +12dB position, the DC potential supplied to cross-point of R20 and R22, and R4 and R6 through point 5 and 7 of CN3 becomes high (H) or Low (L) level and Q10 and Q11 work as shown in the Table below.

Position of High Gain Selection Switch	Q10	Q11
0dB	OFF	OFF
+6dB	OFF	ON
+12dB	ON	OFF

As a result, the gain of Q12 in VIC2 becomes minimum in the 0dB position of SW8. In the +6dB position, the gain of Q12 becomes double of that in the 0dB position. In the +12dB position, the gain of Q12 becomes four times of that in the 0dB position.

The R signal thus controlled its gain is then fed to the Signal Processing Circuit.

4-4-3 R Signal Processing Circuit

The R signal is supplied from the Gain Control circuit to clamp circuit Q13 in VIC2 where the blanking level of R signal is clamped by the clamp pulse (CP) fed to the base of Q13 and the blanking level is set to the DC voltage at the emitter of Q13. The R signal whose blanking potential is set is sent through buffer Q14 in VIC2 to preblanking mixer Q15 in VIC2 where the preblanking (pre BL) pulse fed to the base of Q15 is mixed with the R signal. The mixed R signal is forwarded through buffer Q16 and amplifier Q17/Q18 in VIC2 to black clip Q19/Q23 in VIC2 where low level of R signal is clipped. As a result, the R signal whose pedestal is set is made.

VR2 (R PEDESTAL) in VIC2 sets the pedestal level of the R signal by changing the clamp potential. The pedestal level of R signal is also controlled by the DC voltage fed from the auto control output circuit in the Auto (A) board to the emitter of Q13 through pin 20 of CN1, amplifier IC3(b) and pin 12 of VIC2 in order to match it with the G pedestal in automatic black balance setting. The R signal whose pedestal is set is then fed to the gamma correction circuit.

4-4-4 Gamma Correction Circuit

The R signal undergoes the low level clip and obtained at the emitter of black clip Q19/Q23 is fed through R42 in VIC2 to signal suppression circuit consisting of Q12 - Q14 where the R signal is suppressed as shown in Fig. 4-4-1. The suppression levels are set by the DC voltages fed to the base of Q12 - Q14 from Q27. Q14 suppresses relatively low level of R signal, Q15 is for middle portion and Q16 is for relatively high level.

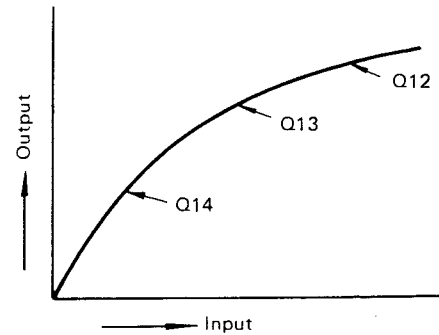


Fig. 4-4-1 R Gamma Correction-1

The suppressed R signal is supplied through buffer Q21 to VR3 (R GAMMA) in VIC2 where it is mixed with non-suppressed R signal fed through buffer Q22 in VIC2. The gamma characteristic can be adjusted by setting VR3 as shown in Fig. 4-4-2.

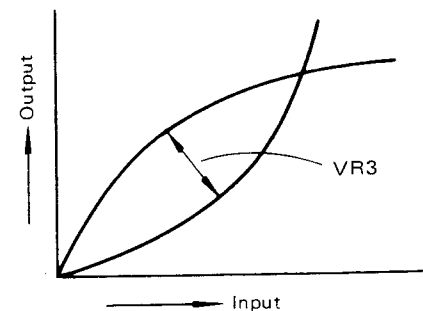


Fig. 4-4-2 R Gamma Correction-2

Q24 in VIC2 is used for feeding bias to Q22 in order to match bias at the base of Q21. The R signal at the emitter of Q19 is sent to the AIC NAM control circuit through Q20 which is a part of NAM circuit.

The gamma-corrected R signal obtained at center arm of VR3 is fed to white clip Q25 in VIC2 where the high level of R signal is clipped by DC voltage set by VR5 (R WHITE CLIP) and fed to the base of Q25. The R signal is then fed through buffer Q26, and pin 19 of VIC2 to the R signal output circuit. VR2 (R GAIN) adjusts the R signal level.

The R signal is fed through buffer Q15 to the emitter of detail mix amplifier Q10 where it is mixed with the horizontal and vertical detail signal which is supplied from the detail output circuit to the base of Q15. The R signal mixed with the detail signal and obtained at the collector of Q16 is fed through R output Q19 to the Encoder circuit and Auto (A) board.

4-5 B Signal Processing Circuit

4-5-1 Dark Shading Correction Circuit

This circuit is same as that for the G signal and R signal. Refer to the circuit description of G dark shading correction circuit.

The blue (B) signal is supplied through pin 4 of CN10, pin 2 of VIC3, buffer Q1 and VR1 (B INPUT GAIN) in VIC3 to emitter of shading correction/amplifier Q2 in VIC3. The B dark shading correction signal is sent from the B shading signal circuit to the emitter of Q2 where it is mixed with the B signal for correcting the dark shading. The B signal which undergoes the dark shading correction and is amplified by Q2 is sent to buffer Q4 in VIC3. The positive horizontal (H) pulse is fed to blanking cleaner Q3 in VIC3 to eliminate the noise during the blanking period.

The B signal at the emitter of Q4 is fed to clamp circuit Q5 in VIC3 where the B signal is clamped by the clamp pulse (CP) supplied to the base of Q5. The clamped B signal is then sent through buffer Q6 in VIC3 and to pin 2 of amplifier IC1 in VIC3 in the gain control circuit. The B signal obtained at the emitter of Q6 is fed through pin 10 of CN2 to the feedback beam control circuit in the Deflection board.

4-5-2 Gain Control Circuit

The B signal is supplied from the dark shading correction circuit to pin 2 of amplifier IC1 which is a part of automatic white balance setting loop to match the B signal to the G signal in level by changing the gain of IC1. The gain of IC1 is controlled by the DC voltage supplied to pin 10 of IC1 from the Auto board through pin 28 of CN1 and pin 9 of VIC3.

The amplified B signal obtained at pin 14 of IC1 is fed through buffer Q7 to clamp circuit Q8 in VIC3 where the B signal is clamped by the CP pulse supplied to the base of Q8. The clamped B signal is then sent through amplifier Q9, Q10 and Q11 in VIC3 high gain control circuit consisting of Q18 and Q19. When the High Gain Selection Switch SW8 on the side of camera is selected to 0dB, +6dB or +12dB position, the DC potential supplied to cross-point of R39 and R40 and R42 and R43 through pins 8 and 9 of CN1 becomes high (H) level or low (L) level and Q18 and Q19 work as shown in the Table below.

Position of High Gain Selection Switch	Q1	Q2
0dB	OFF	OFF
+6dB	OFF	ON
+12dB	ON	OFF

As a result, the gain of Q12 in VIC3 become minimum in the 0dB position of SW8. In the +6dB position, the gain of Q12 becomes double of that in the 0dB position. In the +12dB position, the gain of Q12 becomes four times of that in the 0dB position. The B signal thus controlled its gain is then fed to the Signal Processing Circuit.

4-5-3 B Signal Processing Circuit

The B signal is supplied from the Gain Control circuit to clamp circuit Q13 in VIC3 where the blanking level of B signal is clamped by the clamp pulse (CP) fed to the base of Q13 and the blanking level is set to the DC voltage at the emitter of Q13.

The B signal whose blanking potential is set is sent through buffer Q14 in VIC3 to preblanking mixer Q15 in VIC3 where the preblanking (pre BL) pulse fed to the base of Q15 is mixed with the B signal. The mixed B signal is forwarded through buffer Q16 and amplifier Q17/Q18 in VIC3 to black clip Q19/Q23 in VIC3 where low level of B signal is clipped. As a result, the B signal whose pedestal is set is made.

VR2 (B PEDESTAL) in VIC3 sets the pedestal level of the B signal by changing the clamp potential.

4-5-4 Gamma correction circuit

The B signal undergoes the low level clip and obtained at the emitter of black clip Q19/Q23 in VIC3 is fed through R42 in VIC3 to signal suppression circuit consisting of Q20 - Q22 where the B signal is suppressed as shown in Fig. 4-5-1. The suppression levels are set by the DC voltages fed to the base of Q20 - Q22 from Q27. Q22 suppresses relatively low level of B signal, Q21 is for middle portion and Q20 is for relatively high level.

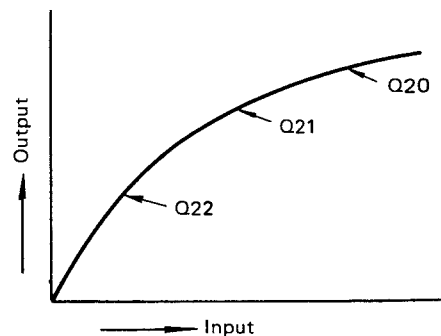


Fig. 4-5-1 B Gamma Correction-1

The suppressed B signal is supplied through buffer Q21 to VR3 (B GAMMA) in VIC3 where it is mixed with non-suppressed B signal fed through buffer Q22 in VIC3. The gamma characteristic can be adjusted by setting VR3 as shown in Fig. 4-5-2.

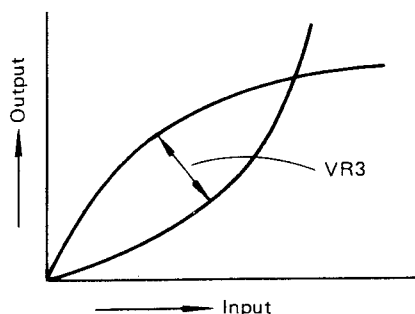


Fig. 4-5-2 B Gamma Correction-2

Q24 in VIC3 is used for feeding bias to Q22 in order to match bias at base of Q21. The B signal at the emitter of Q19 is sent to the AIC NAM control circuit through Q13 which is a part of NAM circuit.

The gamma-corrected B signal obtained at center arm of VR3 is fed to white clip Q25 in VIC3 where the high level of B signal is clipped by DC voltage set by VR4 (B WHITE CLIP) and fed to the base of Q25. The B signal is fed through buffer Q24 to the emitter of detail mix amplifier Q25 when it is mixed with the horizontal and vertical detail signal which is supplied from the detail output circuit to the base of Q25. The B signal mixed with the detail signal and obtained at the collector of Q25 is fed through B output Q26 to the Encoder circuit and Auto (A) board.

4-6 Color Bar Circuit

A NADA gate IC2(d) and an inverter IC2(a) make up the oscillator whose oscillating frequency is set to approximately 153KHz by VR7 (BAR WIDTH). When the color bar/camera selection switch on the side of camera is set to the BAR position, the low potential is sent to pin 7 of NOR gate IC2(b) through pin 3 of CN3 and the preblanking (pre BL) pulse (A) is fed to pin 3 of IC1(a). As a result, the signal (B) is obtained at pin 3 of IC1(a). The signal (B) is fed to the clock input (pin 15) of counter IC1 in VIC5 through pin 13 of VIC5 and is counted down. The B bar signal (C) obtained at pin 6 of IC1, the R bar signal (D) at pin 11 and the G bar signal (E) at pin 14 are fed to the resistor-matrix circuit through buffer in IC3 in VIC5. The B bar signal (C), the R bar signal (D) and the G bar signal (E) are also sent to the AND gate circuit consisting of D2 - D4 in VIC5 and the gated signal (F) is obtained at the anode of D2 - D4. The gated signal (F) is then resistor-mixed with the B bar signal (C), the R bar signal (D), and the G bar signal (E) through in IC3 in VIC5 and the EBU B bar

signal (G), the EBU R bar signal (H), and the EBU G bar signal (I) are made. These EBU bar signals are fed to the camera/bar select circuit.

The pre BL pulse (A) is differentiated by C1 and R1 in VIC5. The negative portion of differentiated signal (J) is removed by D1 in VIC5. The resultant signal (K) is supplied to pin 1 of IC1 to reset IC1 to start counting down.

When the color bar/camera selection switch is set to the CAMERA position, the potential at pin 7 of NOR gate IC2(b) becomes high level, pin 5 of IC2(b) is kept high level regardless of the pre BL pulse and the oscillator stops oscillating. At the same time, the high level is sent to the reset input (pin 9) of IC1 and IC1 stops counting.

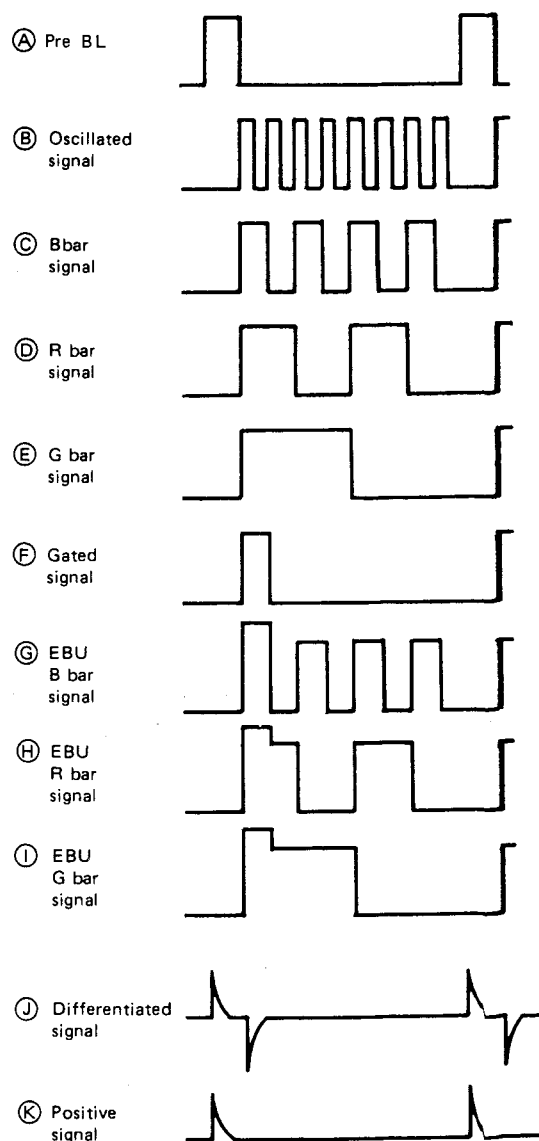


Fig. 4-6-1 Color Bar

4-7 Camera/Bar Select Circuit

The R, G and B color bar signal are supplied from pins 11, 14 and 6 of IC1 in VIC5 to pins 5, 4 and 16 of analog switch IC2 in VIC5. The R, G and B signal

are fed from the Signal Processing circuit to pins 6, 7 and 13 of IC2 through pins 5, 6 and 4 of VIC5.

When the color bar/camera selection switch on the side of camera is set to the BAR position, potential at control terminal (pins 9, 10 and 11) of analog switch IC2 becomes low level and the bar signals are selected in IC2. When the color bar/camera selection switch is set to the CAMERA position, the potential at pins 9, 10 and 11 of IC2 becomes high level and the signals from the Signal Processing circuit are selected. The selected R, G and B signal obtained at pins 3, 1 and 19 of IC2 are sent through respective buffers Q1, Q2 and Q3 to the PIX select. U matrix, V matrix and Y matrix circuit

4-8 U Matrix Circuit

The R signal is supplied from the camera/bar select circuit to the base of mixer Q29 through resistance-matrix Z1 and VR10 (U WHITE BALANCE). The G and B signal are fed to the emitter of Q29 through Z1. The R, G and B signal are resistance-matrixed in the fixed proportion as shown below and the in-phase (U) signal is obtained at the collector of Q29.

$$U = 0.89R - 0.59G - 0.3R$$

The I signal thus made is sent through the 1.5MHz low pass filter (LPF) consisting of R87, R88, C18, C19 and C20, buffer Q30 to the balance modulator (chrominance) circuit. The burst flag pulse (BFP) fed through pin 23 of CN1, VR8 (BURST GAIN) and VR9 (BURST PHASE) is mixed with the U signal at the emitter of Q29.

4-9 V Matrix Circuit

The G signal is supplied from the camera/bar select circuit through resistance matrix Z2 and VR11 (V WHITE BALANCE) to the base of mixer Q31. The R and B signal are sent through Z2 to the emitter of Q31 where they are mixed with the G signal to conform the V signal in the fixed proportion as shown below.

$$V = 0.70R - 0.59G - 0.11B$$

The Q signal made in this way is supplied through the 1.5MHz low pass filter (LPF) consisting of R97, R98, C23, C24 and C25 and buffer Q32 to the balance modulator (chrominance) circuit. The burst flag pulse (BFP) fed through pin 23 of CN1, VR8 (BURST GAIN) and VR9 (BURST PHASE) is mixed with the V signal at the emitter of Q31.

4-10 Balance Modulator (Chrominance) Circuit

The subcarrier (SC) signal is sent through pin 18 of CN1 and LPF CF1 to buffer Q33. The SC signal at emitter of Q33 is sent through VR1 (SC QUAD) in VIC6 and buffer Q1 in VIC6 to pin 16 of balance modulator IC1 in VIC6 for modulation of U signal.

The SC signal whose phase is alternated every line is sent through pin 8 of CN1, LPF CF7 and buffer Q90 to pin 3 of IC1 in VIC6 for balance modulation of V signal.

The U and V modulated signal obtained at pins 8 and 11 are fed through C9, VR4 (U GAIN) and C8 to the U/V mixer Q4 in VIC6.

The modulated mix signal is sent through buffer Q5 and pin 9 of VIC5 to clamp circuit Q1 in VIC7 where the modulated mix signal is clamped by the clamp (CP) pulse supplied to the base of Q1.

The clamped signal is sent to pin 7 of analog switch IC1(a) in VIC7.

The burst flag pulse (BFP) is fed through pin 23 of CN1, inverter IC2(c) and pin 8 of VIC7 to pin 5 of analog switch IC1(b) in VIC7 and the Blanking (BL) signal is fed through pin 7 of CN1, inverter IC2(e) and pin 5 of VIC7 to control terminal (pin 8) of analog switch IC1(b) and terminal pin 5 is connected terminal pin 3 during negative period of BL signal. That signal is fed to control terminal (pin 9) of analog switch IC1(a) and terminal pin 7 is connected terminal pin 1 during positive period of BL/BFP mix signal. The modulated mix signal obtained at pin 1 of analog switch IC1(a) is fed through buffer Q2 in VIC7 to Y/chroma mix circuit. The Y signal from the Y matrix circuit is sent through IC1(c), buffer Q3 and VR4 (Y GAIN) in VIC7 to the emitter of Y/Chroma mix amplifier Q4 in VIC7. The modulated mix signal from the balance modulation circuit is sent through VR3 (CHROMA GAIN) to the emitter of Y/Chroma mix amplifier Q4 where it is mixed with the modulated mix signal.

The Y/Chroma signal obtained at collector of Q4 is fed through amplifier Q5 in VIC5 and pin 13 of VIC5 to the nega/posi circuit.

VR2 (U CARRIER BALANCE) and VR3 (V CARRIER BALANCE) adjust the DC level at pins 5 and 13 of IC1 in VIC6 to minimize the carrier leak from the modulator.

4-11 Y Matrix Circuit

The R, G and B signal are supplied from the camera/bar select circuit through resistance-matrix Z3 to the base of mixer Q34 where they are mixed in the fixed proportion as shown below.

$$Y = 0.59G + 0.3R + 0.11B$$

The Y signal at the emitter of Q34 is sent through buffer Q35 to clamp circuit Q36 where the blanking level of Y signal is clamped and the blanking level becomes +1.8V DC. The clamped Y signal (A) is then sent through analog switch IC1(c) in VIC7 to buffer Q3 in VIC7. The blanking (BL) pulse (B) is fed to control terminal (pin 11) of IC1(c) and terminal pin 13 is connected terminal pin 19 during positive period of BL signal. As a result, the DC voltage during the BL period is set by VR1 (BAR PEDESTAL), VR2 (CAMERA PEDESTAL) in VIC7 or VR1 (TOTAL PEDESTAL) in the Audio board and the pedestal level of Y signal (C) is set.

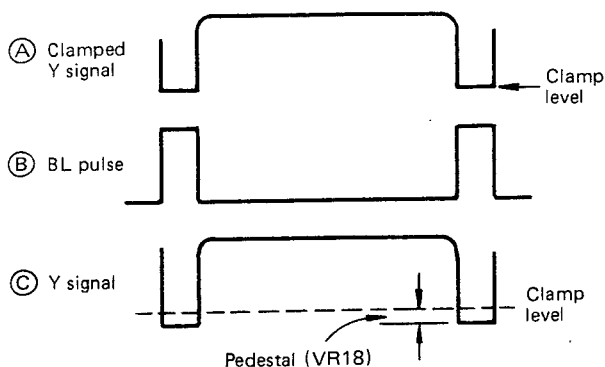


Fig. 4-11-1 Y Pedestal

When the color bar/camera selection switch is set to the BAR position, potential at control terminal (pin 12) of IC1(d) in VIC7 becomes low level and terminal pin 15 is connected terminal pin 17. Therefore, the pedestal level of Y signal for color bar is adjusted by VR1. When the selection switch is set to the CAMERA position, potential at pin 12 of IC1(d) becomes high level and the pedestal level of Y signal can be set by VR2 in VIC7 and VR1 in the Audio board.

The Y signal at the emitter of Q3 is fed to the balance modulator circuit.

4-12 NEGA/POSI Control Circuit

The Y/Chroma signal is sent from the balance modulator circuit to nega/posi separator Q37. The positive Y/Chroma signal obtained at the emitter of Q37 is fed through amplifier Q38 and pin 4 of VIC8 to clamp circuit Q4 in VIC8 where the positive Y/Chroma signal is clamped by the clamp pulse supplied to the base of Q4. The clamped signal is fed to pin 4 of analog switch IC1(a).

The negative Y/Chroma signal obtained at the collector of Q37 is fed through buffer Q39 and pin 3 of VIC8 to clamp circuit Q5 in VIC8 where the negative Y/Chroma signal is clamped by the clamp signal. The clamped signal is fed to pin 7 of analog switch IC1(a) in VIC8. VR1 (NEGA WHITE LEVEL) in VIC8 adjusts the negative Y/Chroma signal level.

The blanking (BL) signal is sent through pin 7 of CN1, inverter IC2(e) and pin 8 of VIC8 to pins 6 and 12 of analog switch IC1(b).

When the NEGA/POSI Selection switch set to the POSI position, the control terminal of IC1(b) at pin 8 becomes low (L) level and terminal pin 5 is connected terminal pin 3. The L level obtained at pin 3 of analog switch IC1(b) is fed to the control terminal (pin 9) of analog switch IC1(a) and terminal pin 4 is connected terminal pin 1. The positive Y/Chroma signal obtained at pin 1 of IC1(a) is fed to the black clip circuit Q1 in VIC8.

When the NEGA/POSI Selection switch set to the NEGA position, the control terminal of IC1(b) at pin 8 becomes high(H) level and terminal pin 6 is connected terminal pin 3. The negative BL signal is sent through pins 6 and 3 of analog switch IC1(b) to the control terminal (pin 9) of IC1(a) and terminal pin 7 is connected terminal pin 1 during positive period of BL signal. The negative Y/Chroma signal obtained at pin 1 of IC1(a) is fed to the black clip circuit Q1.

Also the negative BL signal is fed to the control terminal (pin 12) of analog switch IC1(c) in VIC8 and terminal pin 14 is connected terminal pin 17 during positive period of BL signal.

The high (H) level of BL period is supplied to the base of Q2 and Q2 turning it ON during positive period of BL signal and then clipped to the black level of positive Y/Chroma signal. The positive or negative Y/Chroma signal is fed through amplifier Q3 in VIC8 to pin 13 of analog switch IC1(d) in VIC8.

The sync signal is sent from pin 10 of CN1 and pin 2 of VIC8 to control terminal (pin 11) of IC1(d) in VIC8 and terminal pin 13 is connected terminal pin 19 during positive period of sync signal.

The negative or positive Y/Chroma signal obtained at pin 19 of IC1(d) is sent through buffer Q6 and pin 1 of VIC8 to the fade control circuit.

When the CAMERA/BAR Selection switch set to the BAR position, the potential at cathode of D10 becomes H level and D1 turns ON.

The L level at anode of D10 is sent to pin 14 of analog switch IC1(c). The negative BL signal is fed to the control terminal (pin 12) of analog switch IC1(c) and terminal pin 14 is connected terminal pin 17 during positive period of BL signal. The L level obtained at pin 17 of IC1(c) is fed to the base of Q2 and Q2 turns OFF. The positive or negative Y/Chroma signal from nega/posi select circuit is fed through Q3, IC1(d) and Q6 to the fade control circuit.

4-13 Zebra Control Circuit

When the LEVEL INDICATOR ON/OFF switch set to the ON position, the potential at pin 2 of comparator IC2(a) in VIC9 becomes high (H) level and +1.8V DC is sent through pin 11 of VIC9 and R14 to pin 3 of comparator IC2(a). The compared H level is sent to pin 7 of comparator IC2(b) in VIC9.

The NAM (non-additive mixer) signal (A) made by detecting the highest signal of red(R), green(G) and blue(B) signals in AIC NAM control circuit in the Deflection circuit is sent to pin 5 of comparator IC2(b) where it is compared with the DC voltage set by VR1 (ZEBRA LEVEL) in VIC9 and the signal (B) is obtained at pin 7 of IC2(b).

The signal (B) is sent to control terminal pin 9 of analog switch IC1(a).

The 1/4 subcarrier (SC) signal is sent through pin 14 of CN1, pin 2 of VIC9 and buffer Q1 in VIC9 to pin 7 of analog switch IC1(a). The terminal pin 7 of IC1(a) is connected terminal pin 1 of IC1(a) during the positive portion of signal (B). The signal (C) obtained at pin 1 of IC1(a) is sent through buffer Q3 in VIC5 to the base of Q4 in VIC9. The Y/Chroma signal (D) from video output circuit is sent through pin 10 of VIC9 to the base of Q4 and where it is mixed with the signal (C).

The mixed signal (E) is fed to the clamp circuit Q5 in VIC9 where the mixed signal (E) is clamped by the DC voltage and the clamped mix signal (E) is sent through buffer Q6 in VIC9 to pin 5 of IC1(b) in VIC9. The character control signal (F) is sent to control terminal (pin 8) of analog switch IC1(b) and terminal pin 5 is connected terminal pin 3 during low (L) level period of character control signal. The signal (G) obtained at pin 3 of IC1(b) is sent through pin 6 of VIC9 to the pix out circuit.

When the LEVEL INDICATOR ON/OFF switch set to the OFF position, the potential at pin 2 of comparator IC2(a) becomes L level and +1.8V DC is sent through pin 11 of VIC9 and R14 to pin 3 of comparator IC2(a). The compared L DC level obtained at pin 1 of IC2(a) is sent to control terminal (pin 9) of analog switch IC1(a) and terminal pin 4 is connected terminal pin 1. Therefore, the Y/Chroma signal from video output circuit is sent through Q2, Q6 and IC1(b) to the pix out circuit.

When the CAMERA/BAR Selection switch set to the BAR position, the potential at cathode of D1 becomes H level and D1 turns ON. The L level at anode of D1 is sent to control terminal (pin 9) of analog switch IC1(a) and terminal pin 4 is connected terminal pin 1.

Therefore, the Y/Chroma signal from video signal is sent through Q2, Q6 and IC1(b) to the pix out circuit.

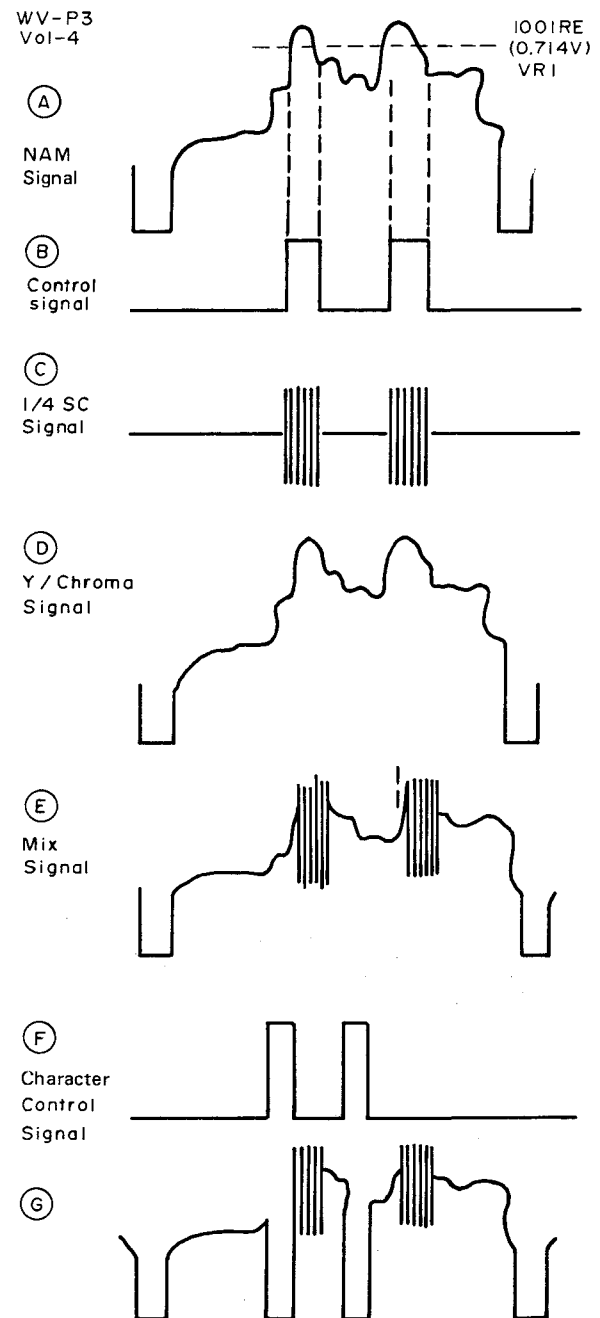


Fig. 4-13-1 Zebra Control

4-14 PIX Out Circuit

The R, G and B signal are sent from Camera/Bar Select circuit to the PIX SELECT SWITCH SW1 and also G signal is sent to the -G ON/OFF SWITCH SW2.

The selected signal from SW1 is sent through buffer Q49 to the emitter of mixer Q50. The G signal from SW2 is sent through inverter Q47 and buffer Q48 to the emitter of mixer Q50 and then the selected signal is mixed with -G signal.

The pix signal obtained at the collector of Q50 is sent through buffer Q51 and pin 9 of VIC11 to clamp circuit Q1 in VIC11. The clamp pulse is sent through pin 11 of VIC11 to the base of Q1. The clamped pix signal is sent to pin 13 of analog switch IC1(d) in VIC11. The IC1(c) is controlled to the clamp level of pix signal.

The blanking (BL) signal is sent through pin 5 of CN1, inverter IC2(e) and pin 6 of VIC11 to control terminal (pin 11) of analog switch IC1(c) and terminal pin 13 is connected terminal pin 19 during period of BL signal. The pix signal obtained at pin 19 of analog switch IC1(d) is sent through buffer Q2 in VIC11 to the base of Q3 in VIC11. The sync signal is sent through pin 10 of CN1 and pin 7 of VIC11 to the base of Q3 and then the pix signal is mixed with the sync signal. The pix signal obtained at the emitter of Q3 is fed to the video output circuit and pin 5 of analog switch IC1(b) in VIC11 respectively.

The zebra signal from the zebra control circuit is sent through pin 7 of VIC11 to pin 6 of analog switch IC1(b).

When the -G ON/OFF SWITCH SW2 set to the ON position, the potential at control terminal (pin 8) of analog switch IC1(b) becomes low (L) level and terminal pin 5 is connected terminal pin 3. The pix signal obtained at pin 3 of analog switch IC1(b) is fed to pin 4 of analog switch IC1(a) in VIC11. The AUX signal is sent through pin 17 of CN1, clamp circuit Q91, buffer Q92 and pin 6 of VIC11 to pin 6 of analog switch IC1(a). The potential at control terminal (pin 9) of IC1(a) becomes L level and terminal pin 4 is connected terminal pin 1. The pix signal obtained at pin 1 of analog switch IC1(a) is sent through pin 10 of VIC11 to the V/F video output circuit.

When the -G ON/OFF SWITCH SW2 set to the OFF position, potential at control terminal (pin 8) of IC1(b) becomes high (H) level and terminal pin 6 is connected terminal pin 3. The zebra signal obtained at pin 3 of analog switch IC1(b) is sent through IC1(a) and pin 10 of VIC11 to the V/F video output circuit.

When the Return Video Button (RET) on the lens pressed the button, potential at control terminal (pin 9) of IC1(a) becomes H level and terminal pin 7 is connected terminal pin 1. The AUX signal obtained at pin 1 of analog switch IC1(a) is sent through pin 10 of VIC11 to the V/F video output circuit.

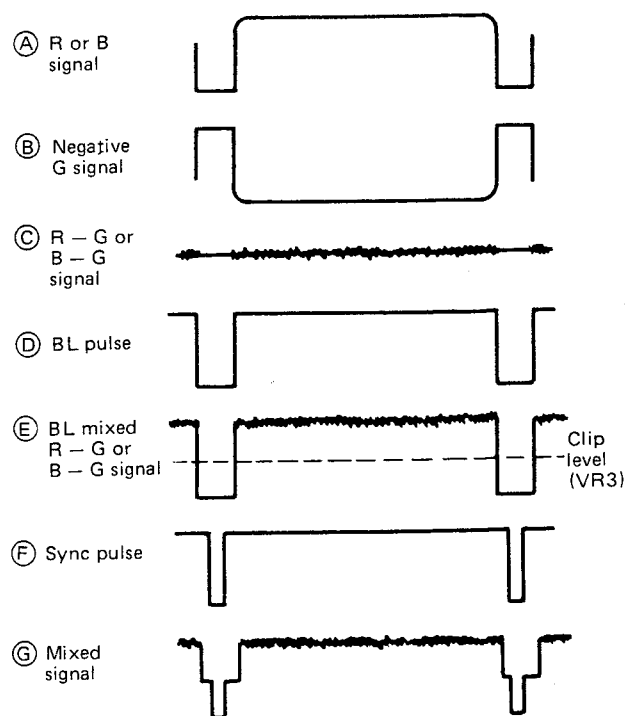


Fig. 4-14-1 PIX Signal

4-15 EXT Title Circuit

This circuit receives the subcarrier (SC) signal for the external color titles generated externally connected optional character generator such as WV-KB12A and sends out one of them to the video output circuit according to the titles displayed in the picture. As a result, the external title with correct color is displayed. The SC signal whose phase is set for the external title is supplied from the optional character generator through pin 3 of CN7, phase shifter Q40/Q41 and buffer Q42 to the base of another buffer Q45.

When the Fade Color Selection switch (SW5) on side of camera is set to the EXT position, the potential at the base of Q43 becomes low (L) level. As a result, Q43 is turned OFF and the SC signal obtained at the emitter of Q5 is sent through pin 5 of VIC10 to the base of Q3 in VIC10.

When the Fade Color Selection switch (SW5) is set to the BLACK or WHITE position, the potential at the base of Q43 becomes high (H) level. As a result, Q43 is turned ON and the SC signal is not sent out.

The external title signal is sent from the character generator through pin 3 of CN7 and pin 2 of VIC10 to the peak detect circuit of Q1 in VIC10 where the signal corresponding to the external titles is detected. The signal is then fed to pin 12 of IC1(c) and fed through R5 to pin 13 of IC1(c).

The SC signal is also sent through pin 8 of VIC10 to the base of switcher Q2 in VIC10. The one of these SC is selected by turning ON and OFF switcher Q2. The high (H) or low (L) level obtained at the emitter of Q2 is sent to control terminal (pin 11) of analog switch IC1(c). The external title signal which corresponds to the SC signal is sent to pin 5 of analog switch IC1(b) in VIC10. When the Fade Color Selection switch (SW5) on the Audio board is set to the EXT position, the potential at the base of Q43 and control terminal (pin 3) of analog switch IC1(b) become L level and Q43 is turned OFF and terminal pin 5 is connected terminal pin 4.

The SC signal is sent through pin 5 of VIC10 to the base of Q3 in VIC10. The external title signal is sent through IC1(b) to the base of Q3 and mixed with the SC signal. The mixed signal obtained at the emitter of Q3 is sent to the fade control circuit pin 3 of IC2 in VIC10.

When the Fade Color Selection switch (SW5) is set to the BLACK position, the potential at control terminal (pin 10) of analog switch IC1(a) in VIC10 becomes L level and terminal pin 2 is connected terminal pin 15. The L level which is made by dividing +4.8V DC with R9/R10 and R11 obtained at pin 15 of IC1(a) is sent to pin 3 of IC1(b). The potential at control terminal pin 6 of IC1(b) becomes H level and terminal pin 3 is connected terminal pin 4 and also the potential at the base of Q43 become H level and Q43 is turned ON and the SC signal is not sent to the base of Q3. The L DC level obtained at pin 4 of IC1(b) is sent through Q3 to the fade control circuit pin 3 of IC2.

When the Fade Color Selection switch (SW5) is set to the WHITE position, the potential at control terminal (pin 10) of analog switch IC1(a) becomes H level and terminal pin 1 is connected terminal pin 15. The H level which is made by dividing +4.8V DC with R9 and R10/R11 obtained at pin 15 of IC1(a) is sent to pin 3 of IC1(b). The potential at control terminal pin 6 of IC1(b) becomes H level and terminal pin 3 is connected terminal pin 4 and also the potential at the base of Q43 becomes H level and Q43 is turned ON and the SC signal is not sent to the base of Q3.

The H DC level obtained at pin 4 of IC1(b) is sent through Q3 to the fade control circuit pin 3 of IC2.

When the momentary fade switch SW2 is depressed (1ST TRIGGER), and connected optional character generator such as WV-KB12A, the fade control signal is sent through pin 5 of CN6, pin 1 of VIC9 and buffer Q7 in VIC9 to pin 15 of analog switch IC1(c). The external title signal is sent through pin 1 of CN7 and pin 3 of VIC9 to the control terminal (pin 12) of analog switch IC1(c) and terminal pin 15 is connected terminal pin 17 during low (L) level of the external title signal. VR2 (EXT TITLE GAIN) is controlled for the external title gain. The fade control signal obtained pin 17 of IC1(c) is sent to pin 13 of analog switch IC1(d) in VIC9. The blanking (BL) pulse is sent through pin 4 of VIC9 to control terminal (pin 11) of analog switch IC1(d) and terminal pin 13 is connected terminal pin 19 during positive period of BL signal. The fade control signal obtained at pin 19 of analog switch IC1(c) is sent through pin 5 of VIC9 and pin 10 of VIC10 to the fade control IC2.

When the momentary fade switch SW2 is depressed and disconnected optional character generator such as WV-KB12A, the fade control signal is sent through pin 5 of CN6, pin 1 of VIC9 and buffer Q9 to pin 15 of analog switch IC1(c). The potential at control terminal (pin 12) of analog switch IC1(c) becomes L level and terminal pin 15 is connected terminal pin 17. The fade control signal obtained at pin 17 of IC1(c) is sent through analog switch IC1(d), pin 5 of VIC9 and pin 10 of VIC10 to the fade control circuit IC2.

The fade controlled Y/Chroma signal obtained at pin 12 of IC2 is sent through buffer Q4 in VIC10 and pin 11 of VIC10 to the video output circuit.

o +1.8V DC Regulator Circuit

The +1.8V DC is generated by regulating +8.6V with IC3 in VIC10.

The reference voltage for +1.8V is obtained by dividing +8.6V with R24 and R25 in VIC10. The output voltage at pin 7 of IC3 is fed back to pin 6 of IC3 for stabilizing +1.8V. The +1.8V DC is supplied to the fade control circuit IC2 as reference voltage.

4-16 Video Output Circuit

The video signal is sent through pin 9 of VIC12 to pin 4 of analog switch IC2(a) in VIC12. The potential at control terminal (pin 4) of analog switch IC2(a) becomes low (L) level and terminal pin 4 is connected terminal pin 1. The video signal obtained at pin 1 of analog switch IC2(a) is sent to pin 6 of analog switch IC2(b). The pix or AUX signal is sent through pin 8 of VIC12 to pin 5 of analog switch IC2(b).

When the -G ON/OFF switch SW2 is set to the OFF position, the potential at control terminal (pin 8) becomes H level and terminal pin 6 is connected terminal pin 3. The video signal obtained at pin 3 of analog switch IC2(b) is sent through pin 10 of VIC12, the video output circuit Q53 - Q55 and pin 1 of E2 (BI2) to the video output connector CN8. Also video signal is sent through pin 10 of VIC12, Q56 and pin 1 of E1 (BI1) to the VTR 14 pin connector CN7.

The video signal or pix signal is sent through pin 12 of VIC12 to pin 16 of IC1(c). The potential at control terminal (pin 11) of IC1(c) becomes L level and terminal pin 16 is connected terminal pin 19.

The video signal or pix signal obtained at pin 19 of IC1(c) is sent through buffer Q2 in VIC12, pin 15 of VIC12 and pin 1 of CN5 to the viewfinder.

When the portable VTR used with camera is set in the playback mode, the portable VTR sends the playback signal with the DC voltage to the camera. The playback signal is sent through pin 1 of E1(BI1) and pin 5 of VIC12 to pin 5 of comparator IC1(b) in VIC12 and pin 13 of IC1(c) respectively. The reference voltage at pin 6 of IC1(b) is obtained by dividing +8.6V DC with R8 and R9 in VIC12.

The H level obtained at pin 7 of comparator IC1(b) is sent to control terminal (pin 11) of analog switch IC2(c) and terminal in 13 is connected terminal pin 19. The VTR playback signal obtained at pin 19 of IC2(c) is sent through buffer Q2, pin 15 of VIC12 and pin 1 of CN5 to the viewfinder.

Also the H level is sent through pin 2 of VIC12, buffer Q57, pin 2 of CN2 and pin 2 of CN3 to the Auto (A) board and the Deflection board respectively.

4-17 2H V.Detail Signal Generator Circuit

4-17-1 1H Delay G Signal Generator Circuit

The G signal is fed from the G signal processing circuit through buffer Q58 to clamp circuit Q59 where the blanking level of G signal is clamped by the clamp pulse (CP) fed to the base of Q59 and the blanking level is set to the DC voltage at the emitter of Q59.

The DC voltage control for VR12 (1H CCD BIAS) and the DC voltage is sent through DC bias controller Q60 to the emitter of Q59.

The clamped G signal is sent through buffer Q61 and pin 2 of VIC13 to the pin 6 of 1H delay circuit IC1 in VIC13. The 1H delayed G signal obtained at pin 3 of IC1 is sent through pin 5 of VIC13, buffer Q62 and VR14 (1H GAIN) to the amplifier Q63/Q64. The 1H delayed G signal is then sent through low pass filter CF2 and buffer Q65 to the 2H V.detail signal generator circuit, the H.detail signal generator and G circuit respectively.

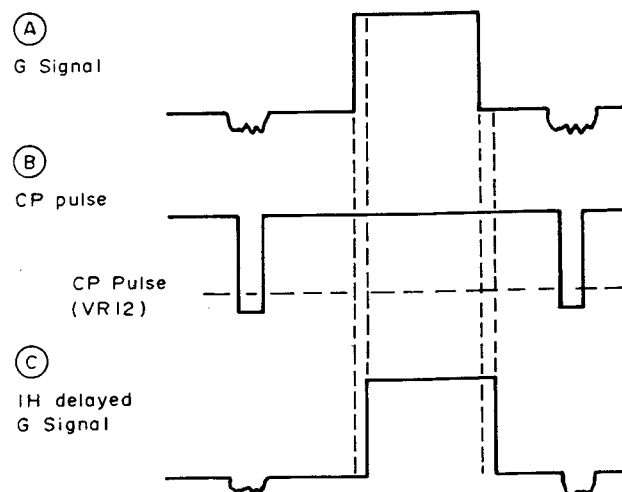


Fig. 4-17-1 1H Delay Circuit

4-17-2 2H Delay G Signal Generator Circuit

The 1H delayed G signal is fed from the 2H V.signal generator circuit through buffer Q66 to clamp circuit Q67 where the blanking level of 1H delayed G signal is clamped by the CP pulse is fed to the base of Q67 and the blanking level is set to the DC voltage at the emitter of Q67.

The DC voltage control for VR13 (2H CCD BIAS) and the DC voltage is sent through DC bias controller Q68 to the emitter of Q67.

The clamped 1H delayed G signal is sent through buffer Q59 and pin 2 of VIC14 to pin 6 1H delayed circuit IC1 in VIC14. The 2H delayed G signal obtained at pin 3 of IC1 is sent through pin 5 of VIC14, buffer Q70 and VR15 (FADE BALANCE) to the amplifier Q71/Q72. The 2H delayed G signal is then sent through low pass filter CF3 and buffer Q73 to the 2H V.detail signal generator circuit.

4-17-3 2H V.Detail Signal Generator Circuit

The non-delayed G signal from the emitter of Q61 through Q74 and 2H delayed G signal from the emitter of Q73 is mixed at the emitter of Q74.

The 1H delayed G signal from the emitter of Q65 is supplied to the base of Q75.

VR1 (PULSE MIX) is a control for the the blanking level of the V.detail signal.

The V.detail signal obtained at the collector of Q75 is fed to the detail out circuit through VR17 (V.GAIN) and buffer Q76. VR17 is a control for V. detail signal.

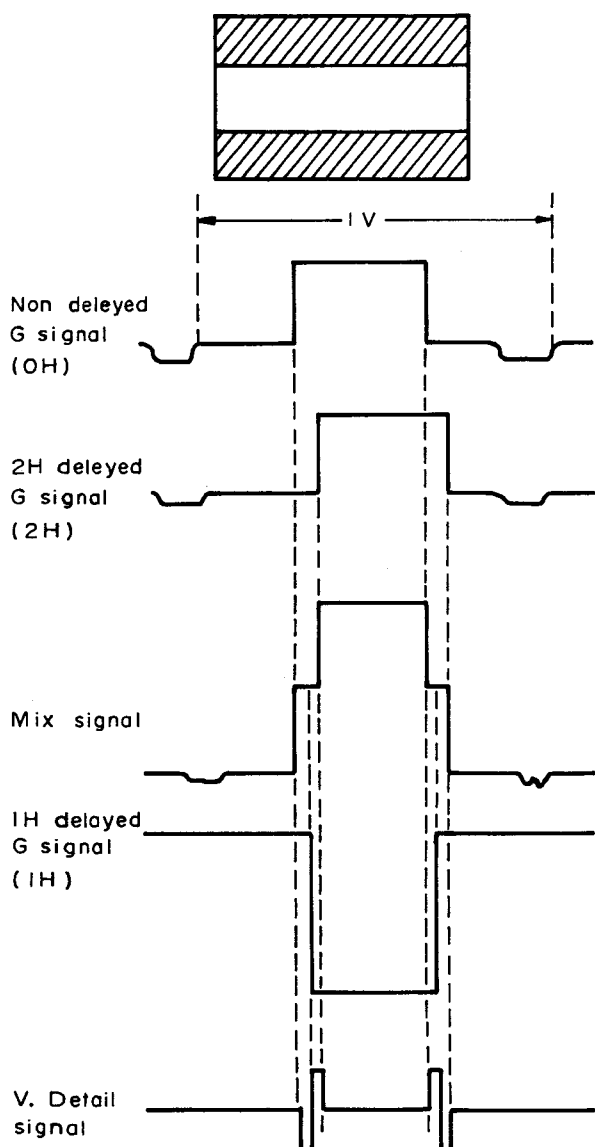


Fig. 4-17-2 V. Detail Signal Generator Circuit

4-18 H.Detail Signal Generator Circuit

The 1H delayed signal from the emitter of Q65 through buffer Q77 is supplied to the H.detail signal generator circuit.

When the camera is aimed at an object (A) for example, the signal (B) passed through Q78, the signal (C) delayed 90ns by delay line CF6 and sent to Q79, and the signal (E) which results from the delayed G signal being reflected back through CF6 and delayed again (180ns) appear at the output of fixed proportions to make up the H detail signal (F).

The H detail signal obtained at the collector of Q79 is sent through VR18 (H.GAIN) and buffer Q81 to the detail out circuit.

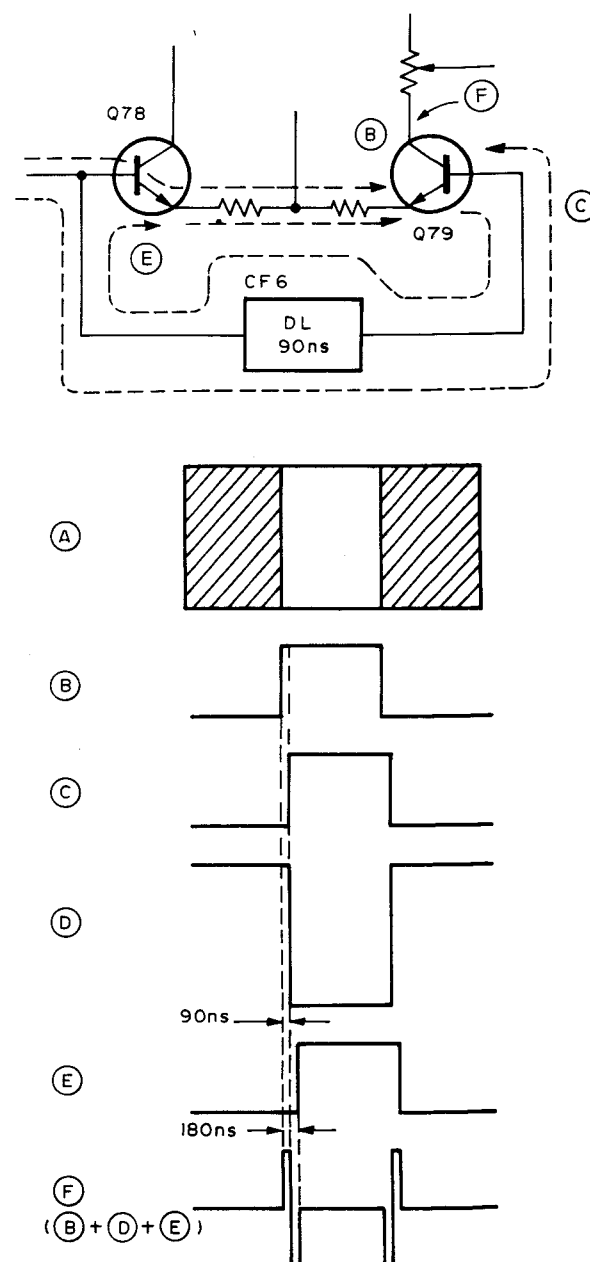


Fig. 4-18-1 H. Detail Signal Generator Circuit

4-19 Detail Out Circuit

The V.detail signal from the emitter of Q76 and the H detail signal from the emitter of Q81 are mixed at the emitter of Q82. The mixed detail signal amplified by Q82 is fed through buffer Q83 to the detail signal dependent circuit consisting of Q87, Q88 and Q89. The potential at the emitter of Q87 is set by the DC voltage adjusted by VR21 (LEVEL DEPENDENT) and sent through buffer/temperature correction Q88.

When the non-delayed G signal (A) is sent to the base of Q87 for example, the detail signal (B) is sent to the base of Q84. At this time, Q87 is turned OFF during the G signal below the specified level, the gate potential of Q89 becomes +8.6V turning ON Q89. As a result, the detail signal corresponding to the G signal below specified level goes to the +8.6V line through C69 and Q89 and no detail signal is sent to Q84. Q87 is turned ON during the G signal above the specified level turning OFF Q89. Therefore, the detail signal is sent to the base of Q84. In this way, the detail signal corresponding to the low G signal is removed and the detail signal (C) is obtained at the emitter of Q84.

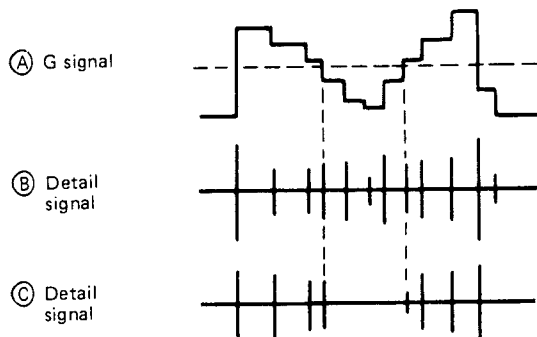


Fig. 4-19-1 Level Dependent

The detail signal is sent to the noise coring circuit which consists of D8, and D9. The detail signal (D) which includes the noise is fed to D8 and D9. The center (noise) portion of the detail signal is suppressed by threshold level of D8 and D9 (E). VR19 (NOISE SUPPRESS) adjusts the noise suppress level.

The detail signal whose level is set by VR20 (DETAIL GAIN) is sent through buffer Q86 to the R, G and B signal processing circuit respectively.

The detail ON/OFF control circuit consisting of Q85. When the detail OFF mode, the high potential is supplied to the base of Q85 and Q85 is turned ON. As a result, no detail signal is sent to Q86.

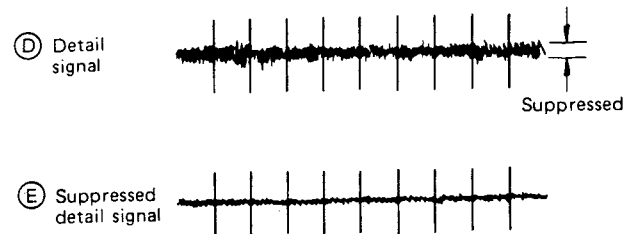


Fig. 4-19-2 Noise Suppression

5. Auto (A) Board

5-1 Microprocessor Circuit

When the color video cameras WV-V3 is used with the portable video cassette recorder AG-2400, the serial data transmission system is performed between the both equipments through VTR cable (WV-CA14/10).

The signals which are exchanged between the two equipments through VTR cable is as shown in Fig. 5-1-1.

Pin	CAMERA	DIRECTION
1	Video OUT (REC) Video IN (P.B)	VTR ↔ CAMERA
2	GND for pin 1	VTR → CAMERA
3	Serial Data IN/OUT	VTR ↔ CAMERA
4	Serial Clock IN	VTR → CAMERA
5	STANDBY ④	VTR ← CAMERA
6	CAMERA PAUSE ⑤	VTR ← CAMERA
7	Audio (CH1 (L)) OUT	VTR ↔ CAMERA
8	GND for Audio	VTR → CAMERA
9	GND for pin 10	VTR → CAMERA
10	+12V	VTR → CAMERA

Fig. 5-1-1 10 Pin Connector Signals

The serial clock signal is a reference signal which is used to control the timing of the data transmission between camera and VTR.

The serial clock signal is produced by VTR's microprocessor and supplied to cameras microprocessor IC21 as shown in Fig. 5-1-2.

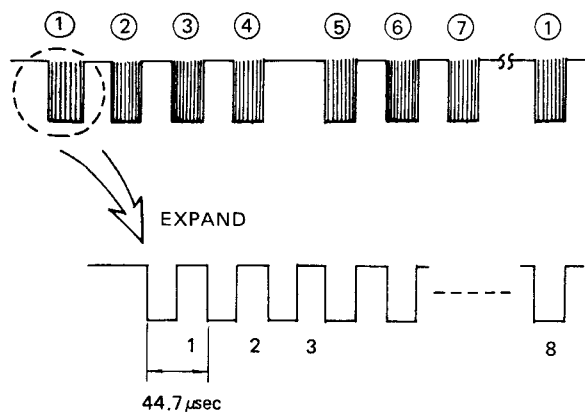


Fig. 5-1-2 Serial Clock

The serial clock signal has seven transmissions, and each transmission consists of 8 bit pulse.

During each transmission, the 8 bit serial data is exchanged as shown in Fig. 5-1-3.

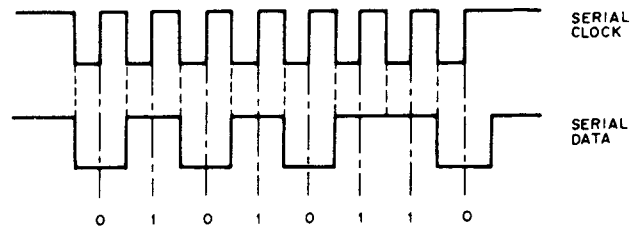


Fig. 5-1-3 Serial Data

The informations are converted into 8 bit logic data inside microprocessor IC21. And for example, the coded data (Serial Data) is (0.1, 0.1, 0.1, 1.0).

The pin identifications and functions of the microprocessor IC21 and IC18 are described in the Fig. 5-1-4 and Fig. 5-1-5.

IC21 μ PD7516HG1

Pin	Name	IN/OUT	Description
1	NC		Not Used
2	P00/INTO	IN	Standby Detect Input (ON=L, Standby=H)
3	P01/SCK	IN/OUT	Serial Clock Input/Output
4	P02/S0	OUT	Serial Data Output
5	P03/S1	IN	Serial Data Input
6	P60	IN	A/D IN
7	P61	IN	Camera Power ON/OFF Detect Input (ON=H, OFF=L)
8	P62	IN	Serial Clock (Tally Detect) Input
9	P63	IN	H Gate Pulse Input
10	P50	IN	Key Scanning Pulse Input
11	P51	IN	Key Scanning Pulse Input
12	P52	IN	Key Scanning Pulse Input
13	P53	IN	Key Scanning Pulse Input
14	P10	OUT	A: Gain up 1 Control Pulse Output (0dB:L, 6dB:L, 12dB:H) B: ACC/ATW Control Output
15	P11	OUT	A: Gain up 2 Control Pulse Output (0dB:L, 6dB:H, 12DB:L) B: TITLE OFF Control Output
16	P12	OUT	A: D/A Switching Control 1 Output B: Green Control Output
17	P13	OUT	A: D/A Switching Control 2 Output B: ACC Gain-1 Output
18	P40	IN	Key Scanning Pulse Input
19	P41	IN	Key Scanning Pulse Input
20	P42	IN	Key Scanning Pulse Input
21	P43	IN	Key Scanning Pulse Input
22	EVENT	IN	Clamp Pulse Input
23	X2	OUT	Clock Pulse Generator
24	X1	IN	Clock Pulse Generator or Clock Pulse Input
25	Vss	--	Ground
26	V	IN	+4.8V DC Power Input (Backup = 2.0V)
27	S7	--	Not Used
28	S6	--	Not Used
29	S5	--	Not Used
30	S4	--	Not Used
31	S3	--	Not Used
32	S2	--	Not Used
33	S1	OUT	Y GATE Control Pulse Output (ATW, AWC=H)
34	S0	OUT	LDI Output
35	T15/S15	OUT	FADE IN/OUT Control Output (FADE OUT=H, FADE IN=L)
36	T14/S14	OUT	FADE Timing Pulse Output
37	T13/S13	--	Not Used
38	T12/S12	--	Not Used
39	T11/S11	OUT	H GATE Pulse Control Output (ACC=L)
40	T10/S10	OUT	REC START/STOP Control Output
41	T9/S9	OUT	REC Tally Control Output (REC=H)
42	T8/S8	OUT	REC LED Output

IC21 μ PD7516HG1

Pin	Name	IN/OUT	Description
43	T7	OUT	Data Output for ADM of MN1237 (IC18)
44	T6	OUT	Data Output for LDI of MN1237 (IC18)
45	T5	OUT	Key Scanning Pulse Output, Data Output for DA5 of MN1237 (IC18)
46	T4	OUT	Key Scanning Pulse Output, Data Output for DA4 of MN1237 (IC18)
47	T3	OUT	Key Scanning Pulse Output, Data Output for DA3 of MN1237 (IC18)
48	T2	OUT	Key Scanning Pulse Output, Data Output for DA2 of MN1237 (IC18)
49	T1	OUT	Key Scanning Pulse Output, Data Output for DA1 of MN1237 (IC18)
50	T0	OUT	Key Scanning Pulse Output, Data Output for DA0 of MN1237 (IC18)
51	V	--	Ground
52	V	--	Ground
53	P30	OUT	A: D/A Select A Output B: ACC Gain-2 Output
54	P31	OUT	A: D/A Select B Output B: R/B Select Output (H:R, L:B)
55	P32	OUT	A: D/A Select C Output B: F-VTR Display
56	P33	OUT	A: ABC Control Pulse Output B: Tally Cancel Signal
57	INT1	IN	Serial Clock Input
58	V	IN	+4.8V DC Power Input
59	P20/PSTB	OUT	Port Control Output
60	P21/PTOUT	OUT	A/B Select Output
61	P22/PCL	OUT	Sampling Pulse Output
62	P23	OUT	Reset Pulse Output
63	RESET	IN	Microprocessor Reset Input
64	PP0	OUT	Power Control for IC18

Fig. 5-1-4

IC18 MN1237B

Pin	Name	IN/OUT	Description
2	D00	OUT	CAMERA/BAR Select Output H:CAMERA, L:BAR
3	D01	OUT	IRIS A/M Select Output H:AUTO, L:MAN/REM
6	D02	OUT	IRIS Close Control Output H:Close
8	D03	OUT	Detail OFF Control Output H:Detail OFF
9	H.SYNC	IN	H.SYNC Input
10	V.SYNC	IN	V.SYNC Input
12	OSC1	IN	Clock Pulse Generator
14	OSC2	IN	Clock Pulse Generator
15	Vss	--	Ground
20	DA0	IN	Data Input Bus-0
22	DA1	IN	Data Input Bus-1
23	DA2	IN	Data Input Bus-2
25	DA3	IN	Data Input Bus-3
28	DA4	IN	Data Input Bus-4
29	DA5	IN	Data Input Bus-5
31	DA6	--	Ground
33	LDI	IN	Strobe Pulse Input
34	ADM	IN	Address Mode Select Input
39	V	IN	+5V Power Supply Input
41	VOW	OUT	Character Signal Output

Fig. 5-1-5

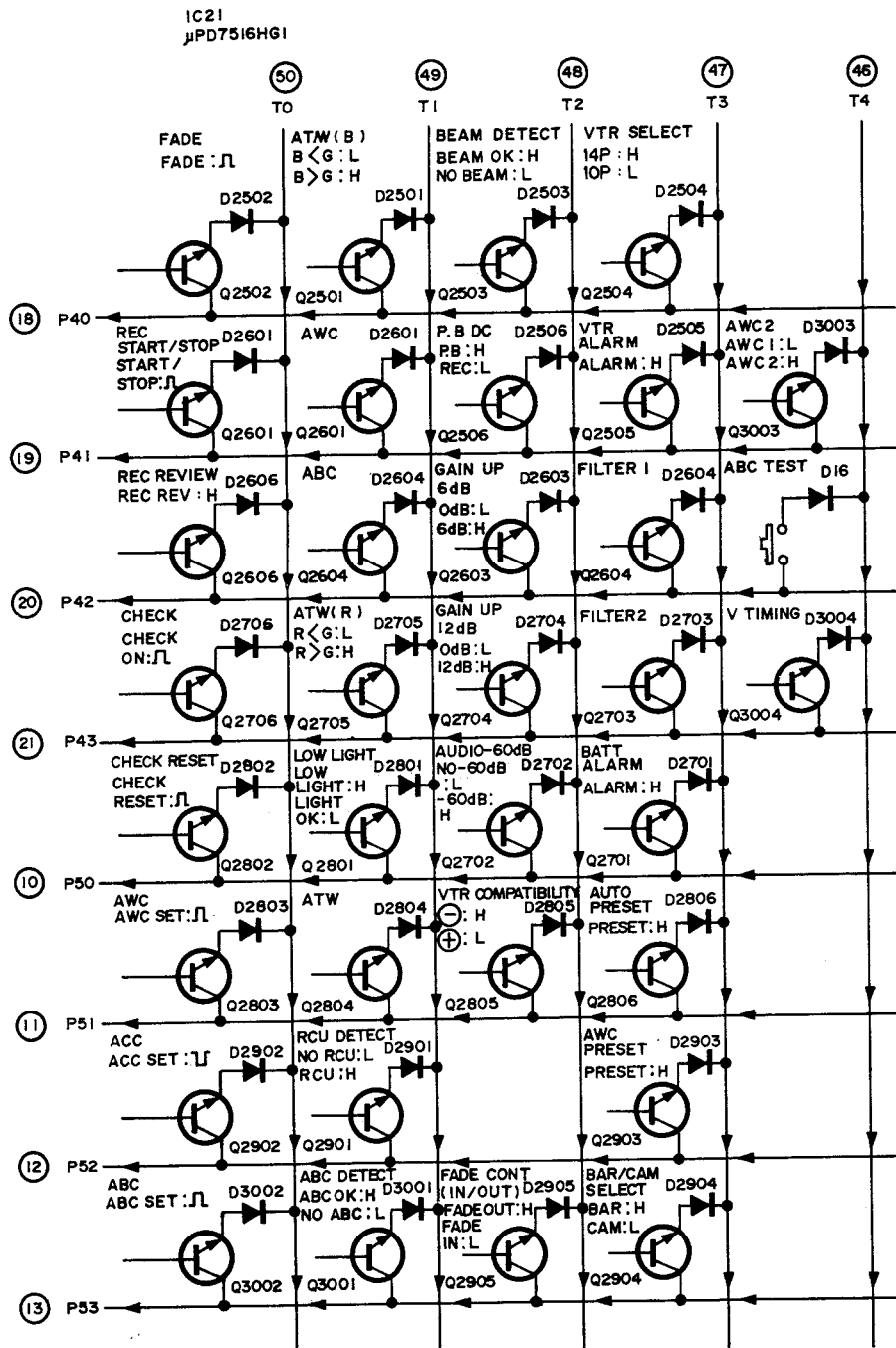


Fig. 5-1-6 Input Matrix Circuit

The programmed signal (Key scan pulse) are supplied from output ports T0, T1, T2, T3 and T4 to input interface circuits.

Then, these programmed signals are supplied from input interface circuits to input port P40, P41, P42, P43, P50, P51, P52 and P53 through switches and transistors. According to the programmed signals at input port P40, P41, P42, P43, P50, P51, P52 and P53, and the signal at the microprocessor identifies the instruction with the signal flow route at input interface circuit and supplies the instructional signals (P40 - P43, P50 - P53) to the data output IC18. The serial clock pulse is supplied from VTR or RCU to pin 3 (PO1/SCK) and pin 57 (INT1) of IC21 to match the timing for data transmitting and receiving to/from VTR or RCU.

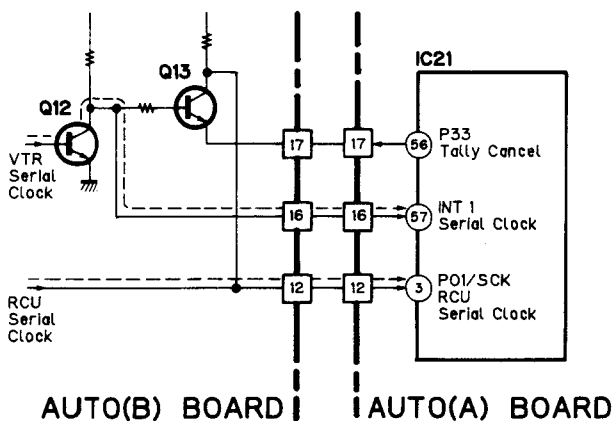


Fig. 5-1-7 Serial Clock Circuit

The serial data is fed from VTR or RCU to pin 5 (PO3/S1) of IC21 so that the microprocessor identifies the instruction from VTR or RCU.

Also the serial data is sent from pin 4 (PO2/S1) of IC21 to VTR or RCU through serial data control circuit in the Auto (B) board.

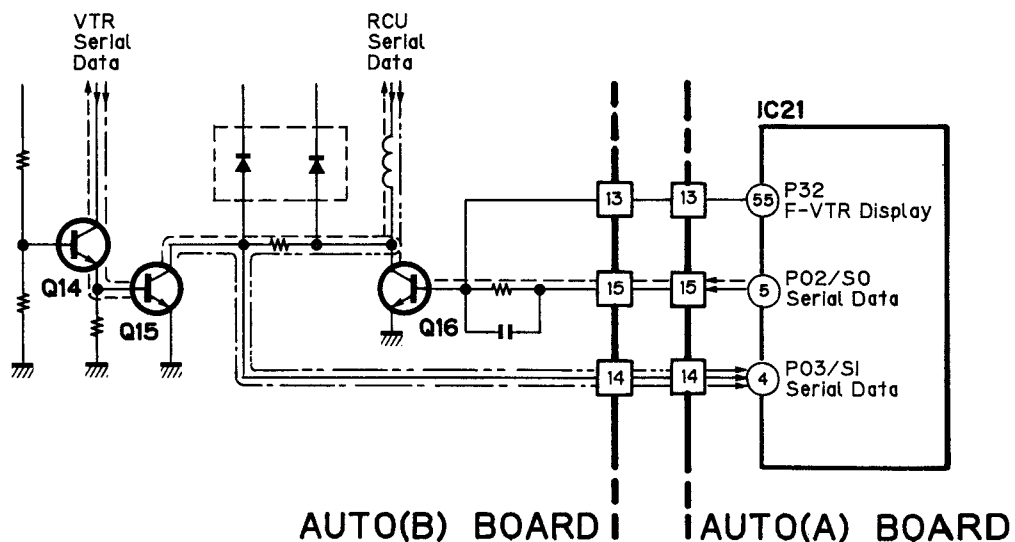


Fig. 5-1-8 Serial Data Circuit

The clamp pulse (CP) is fed from the pulse generator circuit on the Sync board to pin 9 of data output IC18 through amplifier Q28 and the amplified signal is sent to the V.timing pulse generator circuit Q29/Q30. The vertical start pulse (Vp) is sent from the pulse generator circuit on the Sync board to the V.timing pulse generator circuit Q29/Q30 and mixed with CP. The V. timing pulse is fed to pin 22 (EVENT) of IC21 to control the vertical timing.

5-2 Input Interface Circuit

The camera conditions sensor circuit is constructed in the matrix circuit.

The output ports and input ports of the microprocessor in incorporated with the matrix circuit.

The programmed signals (Key scan pulse) are supplied from the output ports T0 - T4 to the matrix circuit so that the programmed signal are returned to the input ports P40 - P43, P50 - P53 through diodes/switches in the matrix circuit.

The microprocessor IC21 will know the function of the camera by detecting the returned programmed signal.

6. Auto (B) Board/Auto (C) Board

The Auto (B) Board/Auto (C) Board contains following circuit.

6-1	Auto Black Control (ABC) Circuit	38
6-2	Auto White Control (AWC) Circuit	40
6-3	Auto Centering Control (ACC) Circuit	41
6-4	Gate Pulse Generator Circuit	43

6-1 Auto Black Control (ABC) Circuit

When the Auto White/Auto Black Set Switch on the front of the camera is pressed down to ABC position for the automatic black balance setting, the iris of the power serve control zoom lens is automatically closed for blocking the incoming light and the black balance is set automatically in approximately 6 seconds. After completing the black balance setting, the lens iris is automatically returned to the previous position.

If the black balance must be set in the manual iris control mode, the incoming light should be blocked by closing the lens iris manually, setting the filter wheel of the camera to No. 4 (CLOSE) or capping the lens. The ABC start pulse is fed to pin 13 of IC21 in the Auto (A) board through the matrix circuit IC30 in the Auto (A) board.

The R,G,B signals are fed from pins 3, 4 and 5 of CN7 to pins 1 and 2 of analog switch IC9(a) and pin 9 of IC7. The analog switch IC9(a) is controlled by the R/B selection pulse at pin 10 of IC9(a) from pin 54 of microprocessor IC21 through pulse selector IC20 so that the R signal is selected when the R/B selection pulse at pin 10 of IC9(a) is high (H) level and the B signal is selected when the R/B selection pulse at pin 10 of IC9(a) is low (L) level.

The R or B signal is then sent through buffer Q7001, amplifier Q7002 and buffer Q8001 to clamp circuit Q8002 where the R or B signal is clamped by the clamp pulse (P) supplied to the base of Q8002. The clamped R or B signal is then sent to pin 3 of analog switch IC9(b).

The analog switch IC9(b) is controlled by the gate pulse at pin 9 of IC9(b) from the gate pulse generator circuit. The R or B signal obtained at pin 4 of IC9(b) is sent through amplifier IC10(a) to pin 2 of analog switch IC11(a).

VR2 (R/B ABC) is control for R/B black balance gain. The G signal is sent through buffer Q7003, amplifier Q7004 and buffer Q8003 to clamp circuit Q8004 where the G signal is clamped by the CP pulse supplied to the base of Q8004. The clamped G signal is sent to pin 13 of analog switch IC9(c).

The analog switch IC9(c) is controlled by the gate pulse at pin 11 of IC9(c) from the gate pulse generator circuit. The G signal obtained at pin 14 of IC9(c) is sent through amplifier IC10(b) to pin 1 of analog switch IC11(a) and pin 14 of analog switch IC11(c) respectively. VR3 (G ABC) is control for G black balance gain.

The analog switch IC11(a) is controlled by the pulse at pin 10 of IC11(a) from pin 16 of microprocessor IC21 through pulse selector IC20 so that the G signal is selected when the R/B/G selection pulse at pin 10 of IC11(a) is H level and R or B signal is selected when the R/B/G selection pulse at pin 10 of IC11(a) is L level. Therefore, R or B or G signal is sent through gain selector IC11(b) to pins 2 or 3 of comparator IC12(a). IC11(b) is controlled by the gain up selection pulse at pin 9 of IC11(b) from pin 14 of microprocessor IC21 so that the 0dB or +6dB is selected when the gain up selection pulse at pin 9 of IC11(b) is L level and +12dB is selected when the gain up selection pulse at pin 9 of IC11(b) is H level.

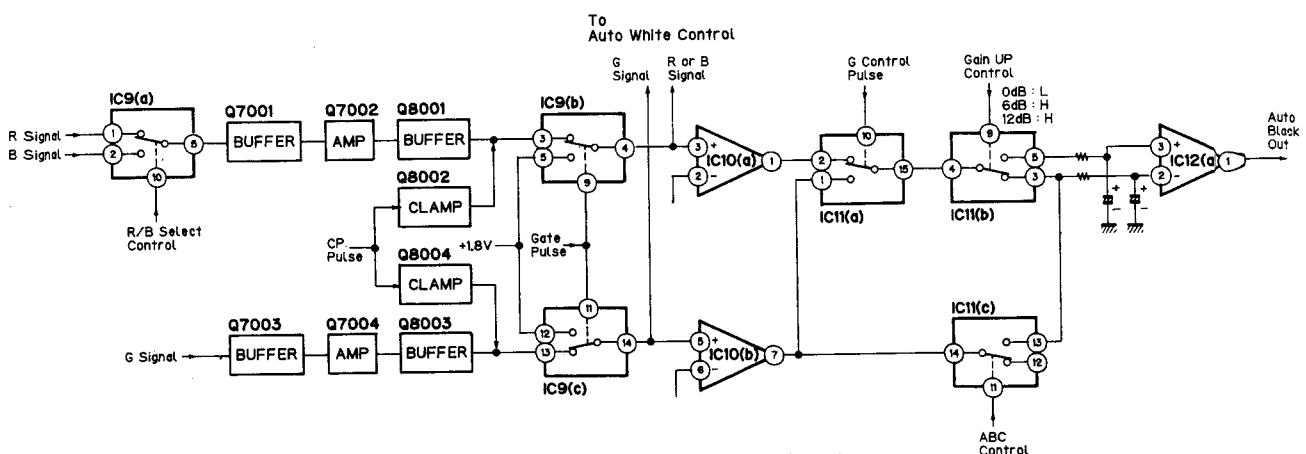


Fig. 6-1-1 Auto Black Control Circuit

The R or B or G signal are integrated by the integrator R96, R97, C21 and C22 for converting DC level.

The analog switches IC9(a), IC11(a), IC11(b) and IC11(c) are controlled the pulses from pins 14, 15, 54 and 56 of microprocessor IC21 in the Auto (A) board respectively as;

- (1) IC11(a) is set to H position and then IC11(b) is set to L position for integrating G signal to DC level by R96 and C21 and fed to pin 3 of comparator IC12(a).
- (2) IC11(b) is switched to H position after G signal is integrated to DC level by R97 and C22 and then IC11(a) is switched to L position for R and B signals.
- (3) IC9(a) is set to L position for B signal so that B signal is integrated to DC level by R97 and C22 and fed to pin 2 of IC12(a), or IC9(b) is set to H position for R signal so that R signal is integrated to DC level by R97 and C22 and fed to pin 2 of IC12(a).

The H or L level at pin 1 of IC12(a) is sent through the matrix circuit IC27 to the pin 21 of microprocessor IC21 in the Auto (A) board.

If the DC level of R or B signal is higher than DC level of G signal, the output of comparator IC12(a) shows H level so that the microprocessor IC21 instructs the countdown 8-bit digital code to D/A converter Z1 and the analog level at pin 10 of Z1 is fed to buffer IC31.

The analog level for countdown is sent through pin 6 of CN4 to IC16(c) in the Auto (C) board for increasing B pedestal level or fed to IC16(d) in the Auto (C) board for increasing R pedestal level until DC level of R-G and B-G signal becomes minimum.

If the DC level of B or R signal is lower than DC level of G signal, the output of the comparator IC12(a) shows L level so that the microprocessor IC21 in the Auto (A) board instructs the 8-bits countup digital code to D/A converter Z1 in the Auto (A) board and analog level at pin 10 of Z1 is fed to buffer IC21 in the Auto (A) board.

The analog level for countup is sent through pin 6 of Cn4 to IC16(c) for increasing B pedestal level or fed to IC16(d) for increasing R pedestal level until DC level of R-G and B-G signal becomes minimum.

As a result, the B and R pedestal level match the G pedestal level automatically and the black balance setting is accomplished, within approximately 6 seconds. During the auto black balance setting, the microprocessor IC21 instructs the gain control pulse from pins 14 and 15 of IC21 and they are supplied to the Process board to +6dB or +12dB alternately.

The black level at +12dB and that in the 0dB position are supplied to microprocessor IC21 through the same route of automatic black control circuit and compared in IC21, IC21 then instructs the 8-bit digital code to D/A converter Z1 and analog level at pin 10 of Z1 is fed to the buffer IC31.

The analog level at pin 1 of IC31 is fed to pin 3 of IC13 and IC14 in the Auto (C) board and fed to IC15(a) for G blanking offset, IC15(b) for B blanking offset and IC15(c) for R blanking offset respectively.

As a result, the R, G and B pedestal level at +18dB position match which that in the 0dB position automatically and the blanking offset control is accomplished together with the auto black control circuit.

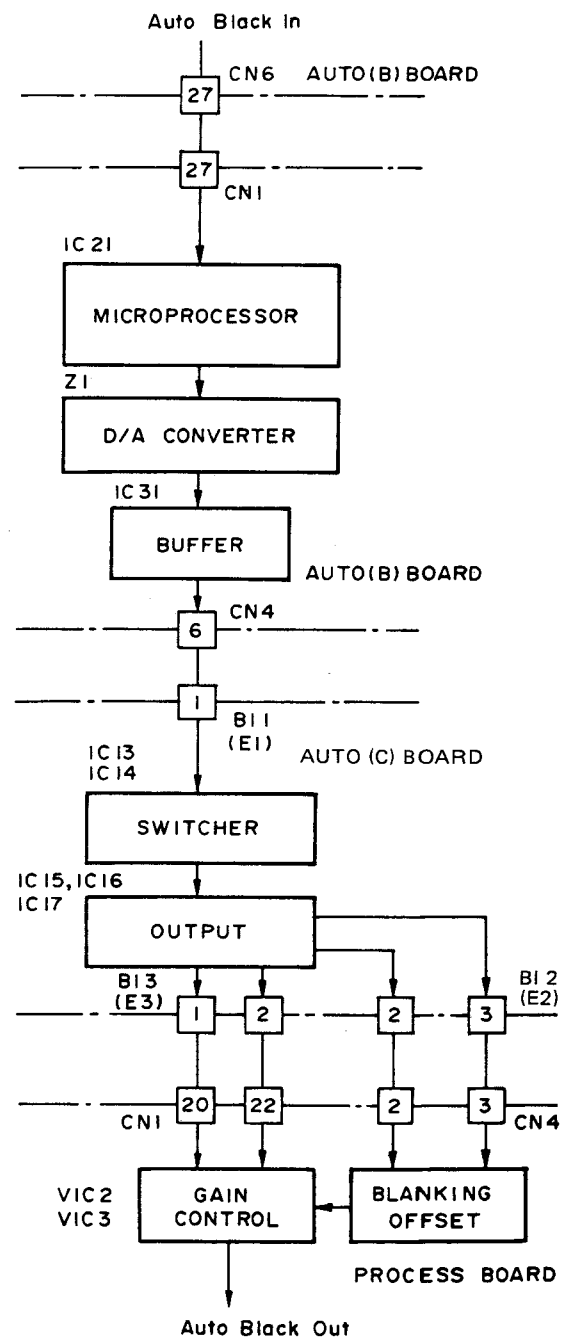


Fig. 6-1-2 Auto Block Control

6-2 Auto White Control (AWC) Circuit

When the Auto White/Auto Black Set Switch on the front of the camera is pressed up to AWC position for the automatic white balance setting while aiming the camera at a white object, the AWC start pulse is fed to the pin 11 of IC21 through pin 11 of CN2 and matrix circuit IC28 as starting of the auto white control circuit.

The R.G.B signals are fed from pins 3,4 and 5 of CN7 to pins 1 and 2 of analog switch IC9(a) and pin 9 of IC7. The analog switch IC9(a) is controlled by the R/B selection pulse at pin 10 of IC9(a) from pin 54 of microprocessor IC21 in the Auto (A) board through pulse selector IC20 in the Auto (A) board so that the R signal is selected when the R/B selection pulse at pin 10 of IC9(a) is high (H) level and the B signal is selected when the R/B selection pulse at pin 10 of IC9(a) is low (L) level.

The R or B signal is then sent through buffer Q7001, amplifier Q7002 and buffer Q8001 to clamp circuit Q8002 where the R or B signal is clamped by the clamp pulse (CP) is supplied to the base of Q8002. The clamped R or B signal is then sent to pin 3 of analog switch IC9(b).

The analog switch IC9(b) is controlled by the gate pulse at pin 9 of IC9(b) from the gate pulse generator circuit. The R or B signal obtained at pin 4 of IC9 is sent to the peak hold circuit Q19/Q21.

The G signal is sent through buffer Q7003, amplifier Q7004 and buffer Q8003 to clamp circuit Q8004 where the G signal is clamped by the CP pulse supplied to the base of Q8004. The clamped G signal is sent to pin 13 of analog switch IC9(c).

The analog switch IC9(c) is controlled by the gate pulse at pin 11 of IC9(c) from the gate pulse generator circuit. The G signal obtained at pin 14 of IC9(c) is sent to the peak hold circuit Q20/Q22.

The peak detected signal is fed to the integrator (R62/C12 for R or B signal and R63/C13 for G signal) for the quasi DC level.

The Q23 and Q24 are functioned for resetting the discharge of capacitors C11 and C13 to be integrator and is controlled by the reset pulse (Vp) from the Sync board through pin 1 of CN7 and inverter Q25.

When the reset pulse is fed at the base of Q23/Q24 and Q23/Q24 are turned ON/OFF so that the capacitors C12 and C13 are discharged and integrators (R62/C12 and R63/C13) are functioned.

The quasi DC level of R or B signal is fed to pin 10 of comparator IC5(a) and the quasi DC level of G signal is fed to pin 9 of comparator IC5(a).

The high (H) or low (L) output at pin 7 of IC5(a) is sent through pin 29 of CN6 and matrix circuit IC26 in the

Auto (A) board to pin 19 of microprocessor IC21 in the Auto (A) board.

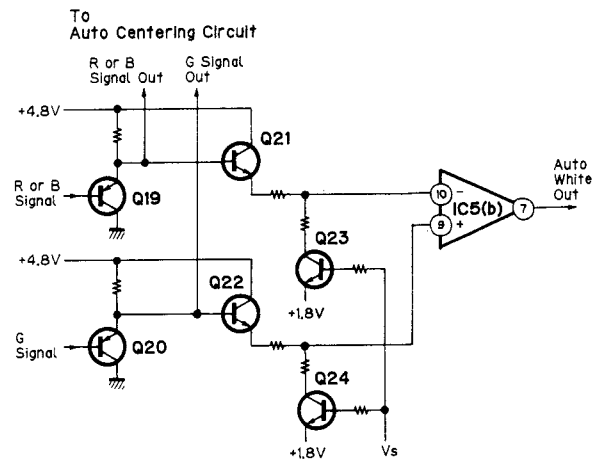


Fig. 6-2-1 Auto White Control Circuit

If the B signal is higher than G signal, the output of IC5(b) is high (H) and the microprocessor IC21 instructs the countdown digital code to D/A converter Z1 for reducing the blue (B) gain in the Process board through the buffer IC31 in the Auto (A) board, the analog switcher IC13 and IC14 in the Auto (C) board. If the B signal is lower than G signal, the output of IC5(b) is low (L) and the microprocessor IC21 instructs the countup digital code to D/A converter Z1 for increasing the blue (B) gain in the Process board. The red (R) gain in the Process board is also controlled as similar way. The adjustment for blue (B) and red (R) are alternately carried.

The microprocessor IC21 sends 8-bit digital code to D/A converter for converting to analog DC level which is fed from pin 10 of Z1 to pin 3 of the buffer IC31. The analog DC level at pin 1 of IC31 is fed to pin 3 of the analog switcher IC13 and IC14 which switch is positioned by the pulse signals at pin 9/10/11 of IC13 and IC14. The pulse signals at pin 9/10/11 of IC13 and IC14 are provided from the pin 53/54/55 of the microprocessor IC21 respectively.

The flow of the analog DC level in the IC13 and IC14 is controlled by the inhibit signal at pin 6 of IC13 and IC14. The inhibit signal for IC13 is provided from pin 14 of IC21 and the inhibit signal for IC14 is provided from pin 15 of IC21.

The analog DC level for the B signal is fed to pin 5 of IC16(b) from pin 2 of the analog switcher IC13 and is fed to the Process board through the mother board. The analog DC level for the R signal is fed to pin 3 of IC16(a) from pin 5 of the analog switcher IC13 and is fed to the Process board through the mother board. These procedure is continued until the color different signal B-G and R-G at IC5(b) becomes minimum. As a result, the B and R signal level match the G signal level automatically and the white balance setting is accomplished.

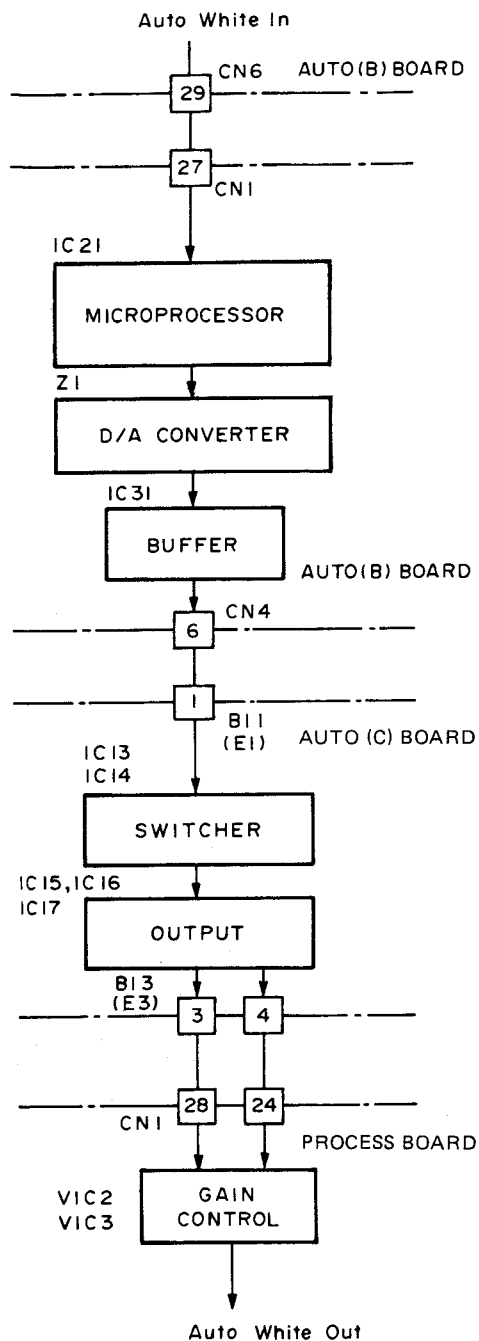


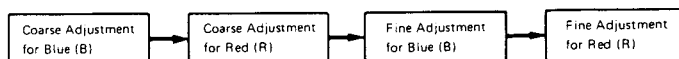
Fig. 6-2-2 Auto White Control

6-3 Auto Centering Control (ACC) Circuit

When the auto centering set switch on the front of the camera is set to the SET position, the low (L) ACC start pulse is fed to the pin 12 of IC21 in the Auto (A) board through pin 15 of CN2 on the Auto (A) board and matrix circuit IC29.

The R or B signal is fed from the peak hold circuit Q19/Q21 to pin 1 of comparator IC1 and the G signal is fed from the peak hold circuit Q20/Q22 to pin 8 of comparator IC1. The color different signal (G-R) or (G-B) is made by the IC1.

The color different signal (G-B) is selected to be output at first, then (G-R) signal is selected as coarse centering adjustment as a cycle. After coarse centering adjustment, the fine centering adjustment for (G-B) and (G-R) signals is carried for the auto centering as;



These sequence are controlled by the analog switcher IC9(a) which is controlled by the pulse signal from pin 54 of IC21.

The color different signal (G-B) and (G-R) (A) at the output of the comparator IC1 is fed to the differentiator C9 and R51 as the high pass filter (H.P.F) for eliminating the low frequency portion in the (G-B)/(G-R) signal, and then detected by D9 to be only positive signal (B) for the positive level microprocessor.

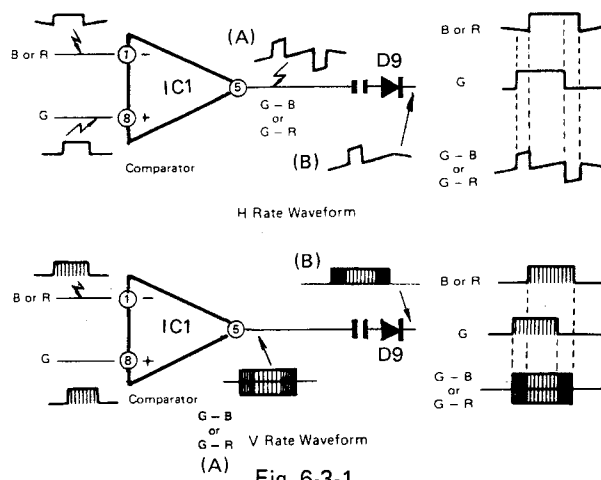


Fig. 6-3-1

The detected signal (B) is fed to the integrator R52 and C10, and then fed to pin 3 of amplifier IC2(a). The amplified signal is fed to pin 14 of analog switch IC3(c). The control pulse (ATW busy pulse) from pin 14 of microprocessor IC21 selects the analog switch IC3(c) to low (L) position for the auto centering control. The amplified signal obtained at pin 14 of analog switch IC3(c) is sent to pin 1 of other analog switch IC3(a).

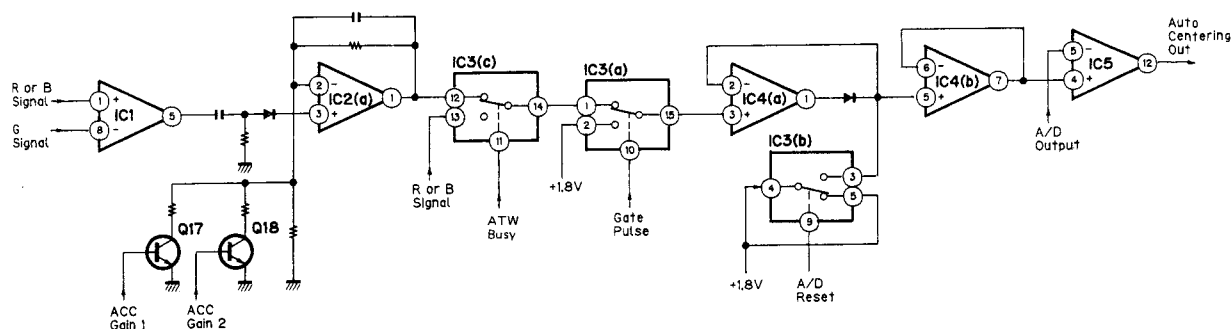


Fig. 6-3-2 Auto Centering Control Circuit

The center area of the images requires the most severe registration so that the window area at the center of the images is selected for the auto centering. Therefore, the color different signal $(G-B)/(G-R)$ at pin 1 of IC3(a) should be controlled by the sampling pulse at pin 10 of IC3(a) which is for window area, and the gated $(G-B)/(G-R)$ signal at pin 15 of IC3(a) is fed to pin 3 of peak hold circuit IC4(a).

The gated $(G-B)/(G-R)$ signal (A) at pin 15 of IC3(a) is fed to the differentiator C26 and R33 as the high pass filter (H.P.F) for eliminating the low frequency portion in the gated $(G-B)/(G-R)$ signal, and then detected by D6 to be only positive signal (B) for the positive level microprocessors. The detected signal (B) is fed to the integrator R34 and C27, and then fed to pin 5 of IC11 (d) which is functioned with D7 and the integrator R37/C29 as peak hold circuit.

The detected/gated $(G-B)/(G-R)$ signal from the pin 15 of IC3(a) is converted by peak hold circuit to the gated quasi DC signal (E) which is proportional to the area of the detected/gated $(R-B)/(R-G)$ signal, so that this gated quasi DC signal (E) or (F) becomes minimum when the auto centering is successfully completed. When the peak hold circuit is functioned, the C11 should be reset at first by IC3(b) which is controlled by the reset pulse at pin 9 of IC3(b) from the pin 60 of the microprocessor IC21. The reset pulse is programmed in the microprocessors IC21 to incorporate with the gated vertical pulse. The IC4(b) is FET input operating amplifier and used as the buffer to prevent the leakage current from pin 4 of IC5(a) to C11.

The gated quasi DC signal (F) is converted by programming in microprocessors IC21 to the digital signal. When the gated quasi DC signal (F) is fed to pin 4 of comparator IC5(a) and the reset pulse from pin 62 of IC21 is fed to pin 9 of IC3(b), the output at pin 12 of IC5(a) becomes high (H) level at first and is fed to pin 6 of IC21. The IC21 is programmed to make the output of the digital signal (8 bit coding) and converted to DC level by digital/analog (D/A) converter Z1.

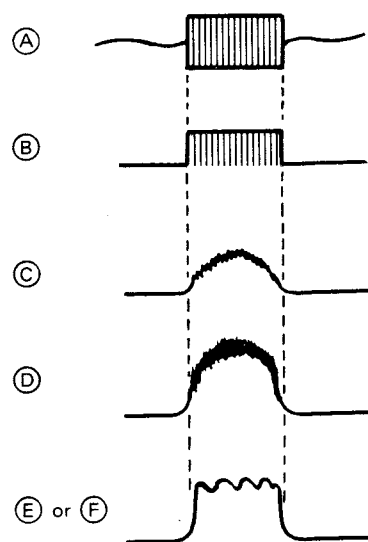
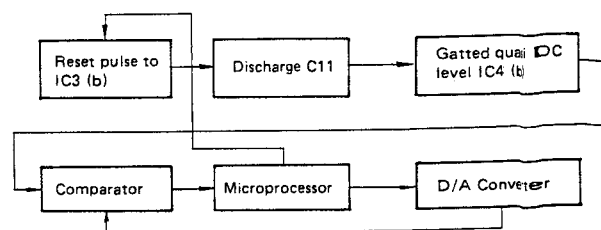


Fig. 6-3-3

The converted DC level by D/A Z1 is fed to pin 5 of IC5(a) through the buffer IC31(a) so that the quasi DC signal and the converted DC level can be compared until the quasi DC level and the converted level are matched. Now the quasi DC signal level is identified by the microprocessor and memorized in form of digital signal. The conversion from DC level to digital signal (digital coding) is processed as;



To avoid the error function when the auto centering is setting against color object or scene, the digital signals are taken 30 times and then one average digital signal is programmed to be output.

It is better to select the fine object or scene for auto centering. The output of the average digital signal is converted by D/A converter Z1 to DC level which is output from pin 10 of Z1 to pin 3 of the buffer IC31. The DC level output at pin 1 of IC31 is fed to pin 3 of the switchers IC13 and IC14 which switch position is selected by the combination of the signal at 9, 10, 11 of IC13 and IC14 from IC21. The switcher IC13 and IC14 are handle 11 channel such as centering, blanking offset, gain control and pedestal control.

The DC level at pin 3 of IC13 and IC14 is controlled by the inhibit at pin 6 of IC13 and 14 which is controlled by IC21.

The DC level for the horizontal blue(B.H) is fed from pin 15 of IC14 to pin 10 of IC17(c) and the output at pin 8 of IC17(c) is fed to the deflection coil for the blue pick-up tube through the Deflection board.

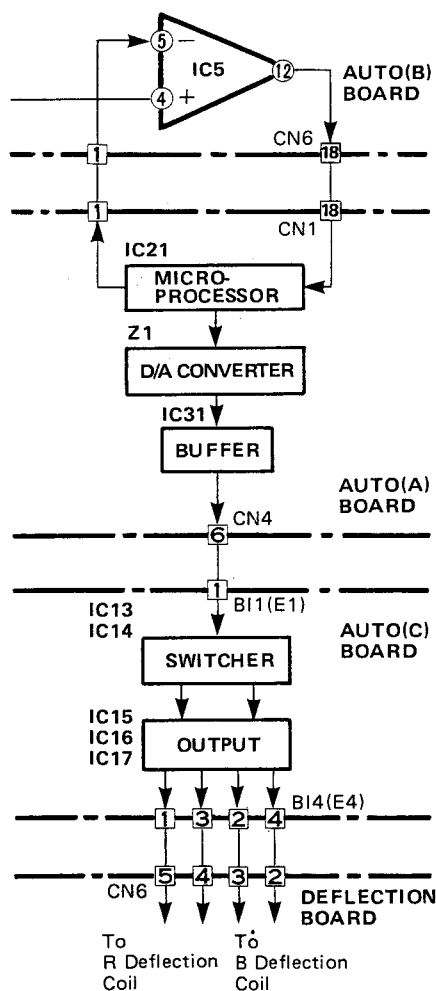


Fig. 6-3-4 Auto Centering Control Circuit

After this DC level is fed to the deflection coil, the new signal is generated. This new color different signal is again processed and compared with previous signal. If the new color different signal is larger than previous, the microprocessor IC21 instructs to output for reducing new color different signal. If the new color different signal is smaller than previous, the microprocessor IC21 instructs to output until the minimum color different signal is reached.

For accurate auto centering function, the gain of peak hold amplifier IC4(a) is changed to three state as;

	GAIN OF IC4(a)	Q17	Q18
(A)	+8 dB	ON	ON
(B)	0 dB	ON	OFF
(C)	-6 dB	OFF	OFF

The control pulse is sent from pins 17 and 53 of microprocessor IC21 to the gain control circuit base of Q17 and Q18.

6-4 Gate Pulse Generator Circuit

The gate pulse is generated by using monostable multivibrator IC6 and IC24.

The clamp pulse (CP) is fed from pin 2 of CN7 to pin 3 of IC6(a) which is triggered by rising part of CP. The output at pin 7 of IC6(a) is the negative pulse with width controlled by R22 and C3. The back edge of the negative pulse at pin 1 of IC6(a) is controlled from the front edge of CP and fed to pin 5 of IC6(b). The monostable multivibrator IC6(b) is triggered by rising part of the negative pulse at pin 5 of IC6(b) and the output of the negative pulse at pin 7 of IC6(b) is obtained.

The width of the negative pulse at pin 7 of IC6(b) is controlled by R20 and C2.

The negative pulse is then sent to pin 9 of microprocessor IC21 through pin 19 of CN6. The positive vertical start (Vs) pulse is fed from pin 1 of CN7 to pin 3 of IC24(a) which is triggered by rising part of the Vs pulse.

The output at pin 1 of IC24(a) is the negative pulse with variable width controlled by H gate pulse from pin 39 of microprocessor IC21 through Q10. The width of negative pulse at pin 1 of IC24(a) is fed to pin 5 of IC24(b).

The monostable multivibrator IC24(b) is triggered by rising part of the negative pulse at pin 5 of IC24(b) and the output of negative pulse at pin 7 of IC24(b) is obtained. The width of the negative pulse at pin 7 of IC24(b) is controlled by H.gate pulse from pin 39 of microprocessor IC21 through Q9.

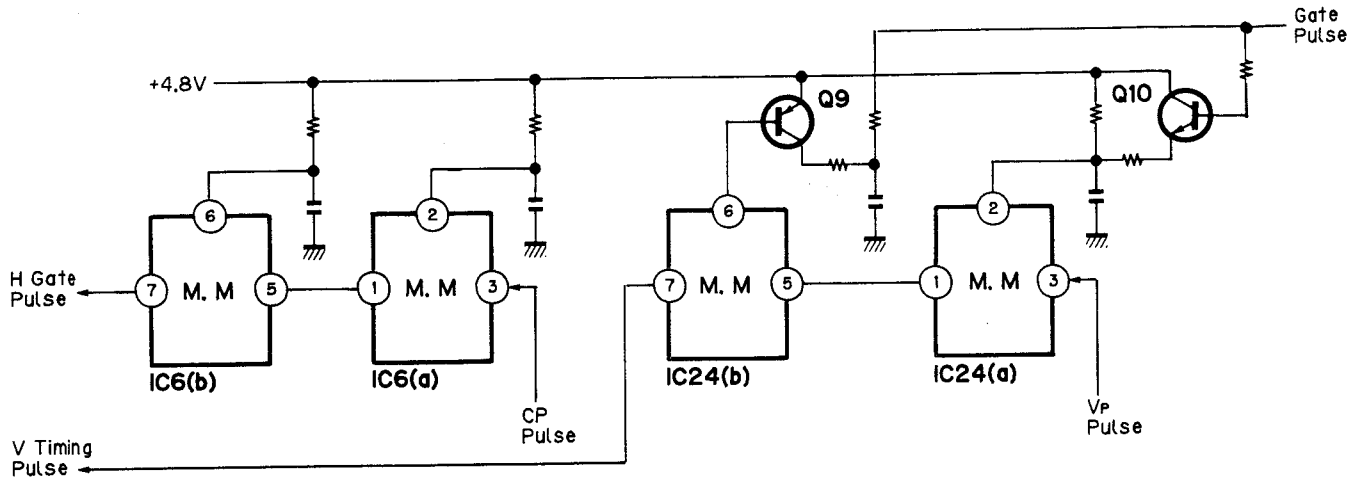


Fig. 6-4-1 Gate Pulse Generator Circuit

The negative pulse is sent to pin 21 of microprocessor IC21 through pin 26 of CN6 and matrix circuit IC30. The Y signal is sent from the Process board through the Auto (A) board and pin 30 of CN6 to amplifier Q1. The amplified Y signal is sent through buffer Q2 and peak clamp Q3 to the AWC control circuit Q4. The control pulse is sent from pin 33 of microprocessor IC21 through pin 28 of CN6 to the base of Q4. When the White Balance Selection Switch is set to the AWC position or the Auto White/Auto Black Set Switch is set to the HOLD position, the high (H) level is sent to the base of Q4 and Q4 is turned OFF. The Y signal is sent through buffer Q5 to D4.

The H.negative pulse is sent from pin 7 of monostable multivibrator IC6(b) to D5. The V.negative pulse is sent from pin 7 of monostable multivibrator IC24(b) to D5 and mixed with the H.negative pulse.

The mixed negative pulse is sent to the AWC control circuit Q6. The H level is sent to the base of Q6 and Q6 is turned OFF. The mixed negative pulse is sent to D4 and mixed with Y signal. The mixed signal is sent to the control terminal (pins 9 and 11) of analog switch IC9(b) and IC9(c) in the auto black control circuit.

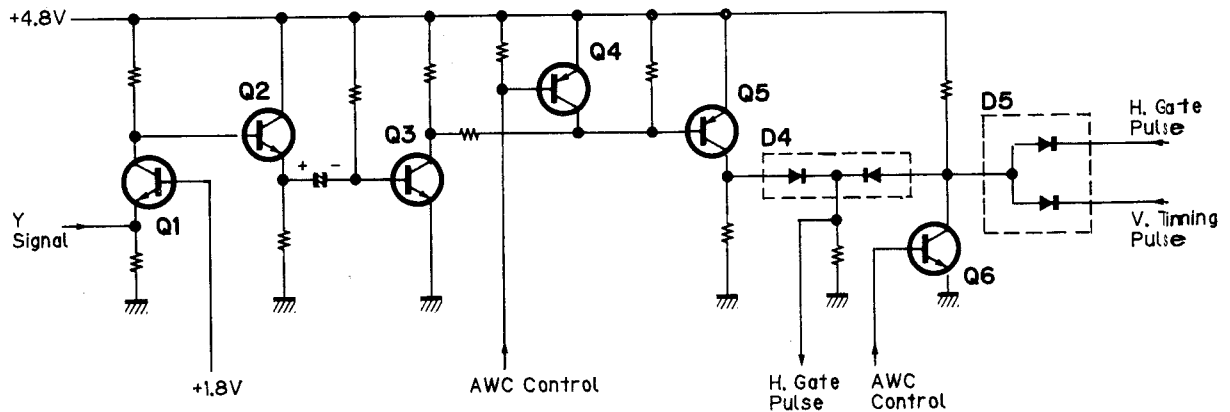


Fig. 6-4-2 Gate Pulse Control Circuit

7. Sync Board

7-1 Int 17MHz Oscillator Circuit

When no signal is supplied to the base of Q2, the high potential level is sent to pin 1 of pulse generator IC1, switcher IC5 and another switcher IC7 respectively, the internal 17MHz oscillator consisting of crystal oscillator X1, CT1 (4.43MHz), C5 and C8 oscillated 17MHz frequency.

The oscillated 17MHz signal is sent to pins 3 and 4 of pulse generator IC1.

7-2 Pulse Generator Circuit

o Pulse Generator Circuit

The composite sync pulse at pin 17 of IC1 is fed through buffer IC2(b) to pin 1 of switcher IC5. The potential at control terminal (pin 13) of IC5 becomes high (H) level and terminal pin 1 is connected terminal pin 2. The composite sync pulse obtained at pin 2 of IC5 is sent through pin 5 of CN8 to the other circuit.

The blanking (BL) pulse at pin 18 of IC1 is fed through buffer IC2(c) to pin 3 of switcher IC5. The potential at control terminal (pin 5) of IC5 becomes H level and terminal pin 3 is connected terminal pin 4. The BL pulse obtained at pin 4 of IC5 is sent through pin 4 of CN8 to the other circuit.

The vertical start (Vs) pulse at pin 19 of IC1 is fed to pin 1 of switcher IC7. The potential at control terminal (pin 13) of IC7 becomes H level and terminal pin 1 is connected terminal pin 2. The Vs pulse obtained at pin 2 of IC7 is sent through pin 3 of CN8 to the other circuit and sent through inverter IC3(b) and pin 5 of CN9 to the other circuit. Also the Vs pulse is sent to the preblanking generator circuit.

The burst flag pulse (BFP) at pin 16 of IC1 is fed to pin 10 of switcher IC5.

The potential at control terminal (pin 12) becomes H level and terminal pin 10 is connected terminal pin 11. The BFP obtained at pin 11 of IC5 is sent through inverter IC8(a) and pin 4 of CN9 to the other circuit. The wide horizontal drive (WHD) pulse at pin 20 of IC1 is fed to pin 8 of switch IC7. The potential at control terminal (pin 6) becomes H level and terminal pin 8 is connected terminal pin 9. The WHD pulse obtained at pin 9 of IC7 is sent to the WHD output circuit Q4/Q5. The WHD pulse is then sent through pin 7 of CN8 to the other circuit. Also the WHD pulse is sent to the horizontal drive (HD) pulse generator circuit IC3(a) clamp pulse (CP) generator circuit IC3(b) and pre-blanking generator circuit IC6 respectively.

The subcarrier 2 (SC2) signal at pin 6 of IC1 whose phase is alternated every lines is fed through buffer IC1(b), buffer Q10 and pin 6 of CN9 to the optional character generator such as WV-KB12E.

SC2 signal is also sent through buffer Q12 and pin 1 of CN8 to the Process board.

The subcarrier 1 (SC1) signal at pin 4 of IC1 is fed through buffer IC1(a) to the 1/4 SC signal generator circuit and fed through buffer Q9 to the tally control circuit. SC1 signal is also sent through buffer Q11 and pin 3 of CN9 to the Process board.

o Horizontal Drive (HD) Pulse Generator Circuit

The WHD pulse is sent from the WHD output circuit to pin 2 of monostable multivibrator IC3(a) and generated the horizontal drive (HD) pulse obtained at pin 13 of monostable multivibrator IC3(a) is sent through the HD output Q6/Q7 and pin 2 of CN9 to the other circuit.

o Clamp Pulse (CP) Generator Circuit

The WHD pulse is sent from the WHD output circuit to pin 10 of monostable multivibrator IC3(b) and generated the clamp pulse (CP) obtained at pin 5 of monostable multivibrator IC3(b) is sent through pin 6 of CN8 to the other circuit.

o Pre-blanking (Pre BL) Pulse Generator Circuit

The Vs pulse is sent from pin 2 of switcher IC7 to mixer D3 through monostable multivibrator IC6(b). The WHD pulse is sent from the WHD output circuit to mixer D3 through monostable multivibrator IC6(b) and mixed with the Vs pulse and generated the Pre-BL pulse obtained at the cathode of D3 is sent through buffer IC2(e) and pin 5 of CN7 to the other circuit.

o 1/4 Subcarrier (SC) Signal Generator Circuit

The SC1 signal is sent from pin 2 of buffer IC2(a) to the base of amplifier Q8. The amplified SC1 signal is fed to monostable multivibrator IC4 and generated 1/4 SC signal obtained at pin 5 of monostable multivibrator IC4 is sent through pin 1 of CN9 to the Process board.

o Tally and Subcarrier (SC) Mic Circuit

The tally control signal is sent from pin 8 of CN9 to the base of Q3.

The SC1 signal is sent from pin 2 of buffer IC2(a) to the emitter of Q3 through buffer Q9 and mixed with the tally control signal.

The mixed signal is sent through pin 7 of CN9 to the optional character generator such as WV-KB12E.

8. Deflection Board

The Deflection board contains following circuit.

8-1	+8.6V/+4.8V DC Regulator Circuit	46
8-2	Horizontal Deflection Circuit	46
8-3	Vertical Sawtooth Generator Circuit	48
8-4	Vertical Deflection Circuit	48
8-5	Vertical Linearity Circuit	48
8-6	Skew Circuit	49
8-7	Target Protection Circuit	49
8-8	High Voltage Circuit	49
8-9	Feedback Beam Control Circuit	50
8-10	Cathode Blanking Circuit	50
8-11	Dynamic Focus Circuit	50
8-12	AIC NAM Control Circuit	50
8-13	AIC Control Circuit	51
8-14	Battery Warning Circuit	51

8-1 +8.6V/+4.8V DC Regulator Circuit

+12V DC power from the power supply or battery is applied through pin 4 of 4P EXT DC connector CN6 or Battery DC Jack CN5, the Audio board and pin 3 of CN9 to the emitter of Q67 and pin 1 of IC6 respectively. +5V DC is generated inside IC6 and used as sub-power inside IC6.

Approx. 120KHz triangular signal is also generated in triangle oscillator (OSC) inside IC6 and fed to the switching amplifier inside IC6.

The triangle oscillator (OSC) level is set by VR29 (SW FREQ).

o +8.6V DC Regulator Circuit

The reference DC voltage supplied to pin 11 of IC6 and +8.6V output DC supplied to pin 10 of IC6 are compared by the error amplifier inside IC6. The error output DC voltage corresponding to the +8.6V DC voltage error and the triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 9 of IC6. The switching pulse is applied to the base of switching transistor Q67 switching ON and OFF Q67 through buffer Q65 and Q66.

As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of switching regulator circuit consisting of Q67, D15 and L11. The generated DC voltage is fed back to pin 10 of IC6 to maintain constant output voltage. The regulated +8.6V DC is then supplied to other circuit as a power through the filters consisting of L11/C95 and L13/C97.

o +4.8V DC Regulator Circuit

The reference DC voltage supplied to pin 4 of IC6 whose level is set by VR30 (+4.8V ADJ) and +4.8V output supplied to pin 5 of IC6 are compared by the error amplifier inside IC6. The error output DC voltage corresponding to the +4.8V DC voltage error and triangular signal supplied from OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 7 of IC6.

This switching pulse is applied to the base of switching transistor Q70 switching ON and OFF Q70 through buffer Q68 and Q69.

As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of switching regulator circuit consisting Q70, D16 and L12. The generated DC voltage is fed back to pin 5 of IC6 to maintain constant output voltage. VR30 is a control for +4.8V output voltage.

The regulator +4.8V is then supplied to other circuits as a power through the filters consisting of L12/C98 and L14/C99.

8-2 Horizontal Deflection Circuit

8-2-1 G Horizontal Deflection Circuit

The horizontal scanning start (Hs) pulse is fed from pin 10 of CN2 to horizontal deflection output Q4 through switching amplifier Q3.

When Q4 is switched by the Hs pulse from Q3, the collector current of Q4 resonated with L1 and C5, and resultant horizontal sawtooth current coil for the G pick-up tube. The DC voltage set by VR1 (G H.SIZE) is fed to control the power supply voltage for Q4.

When SW1 (OVERSCAN SWITCH) is set to the OVERSCAN position, the collector potential of Q4 increases. Therefore, the H sawtooth current increases of the H overscanning.

The horizontal (H) pulse (A) produced from the collector of Q4 is integrated by L2 (G H-LIN2) and R13 into a sawtooth signal (B). This sawtooth signal is again integrated by L2 into a parabola signal (C) which is applied through R12 and pin 8 of VIC 1 to pin 2 of IC1(a) in VIC 1 as a G H-linearity correction signal. The H pulse (A) from Q4 is integrated by VR2 (G H-LIN1), R9 and C10 into a linearity correction signal (D) for correcting the linearity of the starting portion of H sawtooth current waveform. The signal (D) is sent through pin 6 of VIC 1 of pin 3 of IC1(a) in VIC 1 where the linearity correction signal (C) and (D) are mixed and amplified.

The mixed signal (E) of these correction signals at pin 1 of IC1(a) is fed through pin 7 of VIC 1 to the G H deflection coil to correct the linearity of the horizontal sawtooth current waveform.

L2 (G H-LIN2) is a control for adjusting the overall linearity of sawtooth current and VR2 (G H-LIN1) for adjusting the H linearity of the starting portion.

The DC voltage set by VR3 (G H-CENTERING) is fed through amplifier IC1(b) to the H deflection coil for the G pick-up tube.

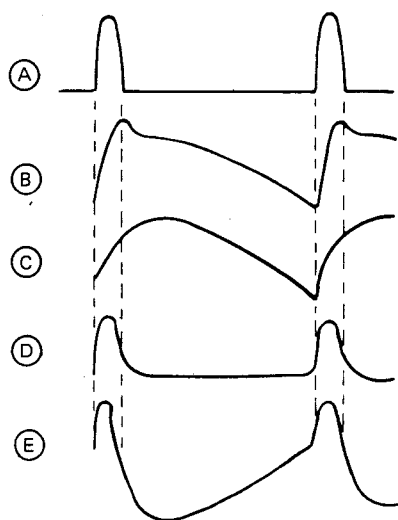


Fig. 8-2-1 Horizontal Linearity Correction-2

8-2-2 B Horizontal Deflection Circuit

The horizontal scanning start (Hs) pulse is fed from pin 10 of CN2 to horizontal deflection output Q9 through switching amplifier Q3.

When Q9 is switched by the Hs pulse from Q3, the collector current of Q9 resonated with L4 and C23, and resultant horizontal sawtooth current coil for the B pick-up tube. The DC voltage set by VR7 (B H-SIZE) is fed to control the power supply voltage for Q9.

When SW1 (OVERSCAN SWITCH) is set to the OVERSCAN position, the collector potential of Q9 increases, therefore, the H sawtooth current increases of the H overscanning.

The horizontal (H) pulse produced from the collector of Q9 is integrated by L5 (B H-LIN2) and R38 into a sawtooth signal.

This sawtooth signal is again integrated by L5 into a parabola signal, which is applied through R37 and pin 15 of VIC 1 to pin 2 of IC2(a) in VIC 1 as a B H-linearity correction signal.

The H pulse from Q9 is integrated by VR8 (B H-LIN1), R34 and C28 into a linearity correction signal for correcting the linearity of the starting portion of H sawtooth current waveform.

The signal is sent through pin 16 of VIC 1 to pin 3 of IC2(a) in VIC 1 where the linearity correction signals at pin 1 of IC2(a) is fed through pin 14 of VIC 1 to the B H deflection coil to correct the linearity of the horizontal sawtooth current waveform.

L5 (B H-LIN2) is a control for adjusting the overall linearity of sawtooth current and VR8 (B H-LIN1) for adjusting the H linearity of the starting position.

The DC voltage set by VR9 (B H-CENTERING) which controls the H-centering of B image is sent to pin 3 of amplifier IC2(a) and it is mixed with the skew signal sent to pin 2 of IC2(a) from the skew circuit. The mixed signal for the B pick-up tube.

8-2-3 R Horizontal Deflection Circuit

The horizontal scanning start (Hs) pulse is fed from pin 10 of CN2 to horizontal deflection output Q15 through switching amplifier Q3.

When Q15 is switched by the Hs pulse from Q3, the collector current of Q15 resonated with L7 and C41, and resultant horizontal sawtooth current coil for the R pick-up tube. The DC voltage set by VR13 (R H-SIZE) is fed to control the power supply voltage for Q15.

When SW1 (OVERSCAN SWITCH) is set to the OVERSCAN position, the collector potential of the H overscanning.

The horizontal (H) pulse from the collector of Q15 is integrated by L8 (R H-LIN2) and R64 into a sawtooth signal. This sawtooth signal is again integrated by L8 into a parabola signal, which is applied through R63 and pin 25 of VIC 1 to pin 2 of IC3(a) in VIC 1 as a B H-linearity correction signal.

The H pulse from Q15 is integrated by VR14 (R H-LIN1), R60 and C46 into a linearity correction signal for correcting the linearity of the starting portion of H sawtooth current waveform. The signal is sent through pin 24 of VIC 1 to pin 3 of IC3(a) in VIC 1 where the linearity correction signals are mixed and amplified. The mixed signal of these correction signals at pin 1 of IC3(a) is fed through pin 26 of VIC 1 to the R H deflection coil to correct the linearity of the horizontal sawtooth current waveform.

L8 (R H-LIN2) is a control for adjusting the overall linearity of sawtooth current and VR14 (R H-LIN1) for adjusting the H linearity of the starting position.

The DC voltage set by VR15 (R H-CENTERING) which controls the H-centering of R image is sent to pin 3 of amplifier IC2(b) and it is mixed with the skew signal sent to pin 2 of IC2(b) from the skew circuit. The mixed signal for the B pick-up tube.

8-3 Vertical Sawtooth Generator Circuit

The vertical scanning start (Vs) pulse is fed through pin 16 of CN2 to the base of inverter Q6. The positive V pulse at the collector of Q6 is integrated by R216, C16 and C17 into the V sawtooth signal. The V sawtooth signal is fed through buffer Q7 to the vertical deflection circuit, vertical linearity circuit and skew circuit. The V sawtooth signal is integrated by R28 and C17 into the V parabola signal. The V parabola signal is mixed with the V sawtooth signal through C16 to compensate the linearity of V sawtooth signal.

8-4 Vertical Deflection Circuit

8-4-1 G Vertical Deflection Circuit

The vertical (V) sawtooth signal generated in the V sawtooth generator circuit is fed through VR12 (TOTAL V-SIZE), buffer Q11 and pin 13 of VIC 1 to pin 6 of amplifier IC1(b) in VIC 1. The amplified V sawtooth signal obtained at pin 7 of IC1(b) is fed through pin 9 of VIC 1 to the V deflection coil for G pick-up tube. The DC voltage set by VR1 (G V-CENTERING) in VIC 1 is fed to pin 6 of IC1(b) to change the vertical position of deflection.

VR12 (TOTAL V-SIZE) is a control for adjusting vertical deflection size for G, R and B pick-up tubes. When the SW1 (OVERSCAN SWITCH) is set to the OVERSCAN position, the V sawtooth signal supplied to pin 6 of IC1(b) is increased. As a result, the V sawtooth current from pin 7 of IC1(b) is increased for the V overscanning. This switch also increases the V sawtooth current for the R and B pick-up tube.

8-4-2 B Vertical Deflection Circuit

The vertical (V) sawtooth signal at pin 13 of VIC 1 is fed to pin 6 of amplifier IC2(b) in VIC 1. The DC voltage set by VR3 (B V-CENTERING) in VIC 1 which controls the V-centering of B image is sent to pin 6 of IC2(b) and it is mixed with the V sawtooth signal.

The V linearity correction signal is sent from the V linearity circuit to pin 5 of IC2(b).

The amplified V sawtooth signal obtained at pin 7 of IC2(b) is sent through pin 18 of VIC 1 to the V deflection coil for the B pick-up tube.

VR2 (B V-SIZE) in VIC 1 is a control for adjusting vertical deflection size for B pick-up tube.

8-4-3 R Vertical Deflection Circuit

The vertical (V) sawtooth signal at pin 13 of VIC 1 is fed to pin 6 of amplifier IC3(b) in VIC 1. The DC voltage set by VR5 (R V-CENTERING) in VIC 1 which controls the V-centering of R image is sent to pin 6 of IC3(b) and it is mixed with the V sawtooth signal.

The V linearity correction signal is sent from the V linearity circuit to pin 5 of IC3(b).

The amplified V sawtooth signal obtained at pin 7 of IC3(b) is sent through pin 29 of VIC 1 to the V deflection coil for the R pick-up tube.

VR4 (R V-SIZE) in VIC 1 is a control for adjusting vertical deflection size for R pick-up tube.

8-5 Vertical Linearity Circuit

The vertical (V) sawtooth signal obtained at the emitter of Q7 in the vertical sawtooth generator circuit is integrated by R30 and C20 and converted into a V parabola signal. The V parabola signal thus made is then fed to phase splitter Q5 where the positive and negative V parabola signal is obtained at its emitter and collector. The positive and negative V parabola signal are then sent to VR4 (R V-LIN), VR5 (B V-LIN) and VR6 (G V-LIN) respectively.

The V parabola signal whose polarity and level are adjusted by VR4 (R V-LIN) is sent through pin 3 of VIC 1 to pin 5 of IC3(b) in VIC 1 and mixed with the V deflection sawtooth signal whose polarity and level are adjusted by VR5 (B V-LIN) is also sent through pin 2 of VIC 1 to pin 5 of IC2(b) and mixed with the V deflection sawtooth signal for B pick-up tube as a V linearity correction signal.

The V parabola signal whose polarity and level are adjusted by VR6 (G V-LIN) is sent through pin 1 of VIC 1 to pin 5 of IC1(b) in VIC 1 and mixed the V deflection sawtooth signal for G pick-up tube as a V linearity correction signal.

8-6 Skew Circuit

The vertical (V) sawtooth signal obtained at the emitter of Q7 in the vertical sawtooth generator circuit is fed through buffer Q11 to phase splitter Q11, where the negative and positive V sawtooth signal is obtained at its emitter and collector. The V sawtooth signal whose phase and level are set by VR10 (B SKEW) is sent through the centering/skew output circuit to the H deflection coil for the B pick-up tube as a skew signal. Similarly the V sawtooth signal adjusted by VR11 (R SKEW) is sent through the centering/skew output circuit to the H deflection coil for the R pick-up tube.

If no V sawtooth signal is mixed to the H deflection sawtooth signal (current) (A), the signal level at the center portion (a), (b) and (c) on the H deflection sawtooth current is almost equal and the electron beams corresponding to point (a), (b) and (c) position as shown in Fig. 8-6-2 (A).

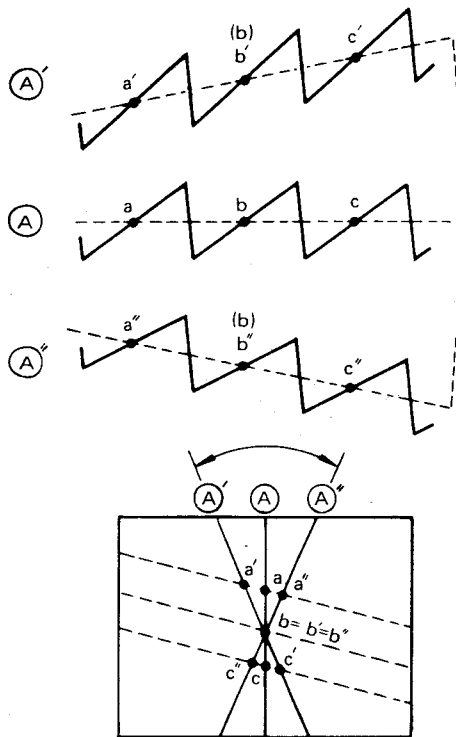


Fig. 8-6-1 Skew Control

If the positive V sawtooth signal is added to the H deflection sawtooth signal (A), the signal level at (a') is lower than (b') and that at (c') is higher than (b'). As a result, the electron beams corresponding to point (a'), (b') and (c') position as shown in Fig. 8-6-2 (A'). On the other hand, if the negative V sawtooth signal is mixed (A''), the electron beams corresponding to point (a''), (b'') and (c'') position as shown in A.

In this way, the vertical line of R and B images is tilted by adjusting the polarity and level of V sawtooth signal mixed with the H sawtooth signal in order to match the R and B images with the reference G image.

8-7 Target Protection Circuit

The H flyback pulse obtained at the collector of Q4 in the horizontal deflection circuit is fed to rectifier, consisting of D3 and C51, where the H flyback pulse is converted into the DC voltage. The DC voltage is then applied to switching circuit Q16/Q17. The V sawtooth signal obtained at pin 7 of IC1(b) in VIC 1 in G V deflection circuit is sent through pin 21 of VIC 1 to rectifier consisting of D2, C48 and C49, where it is converted into the DC voltage.

When the H and V deflection circuits work properly, the H flyback pulse and the V sawtooth signal are fed to Q16/Q17 and Q18 respectively turning Q16 ON and Q17 OFF. Therefore, the high(H) level which is made by rectifying the V sawtooth signal with D2 is sent to the high voltage circuit through amplifier Q19 to generate the high voltages for the pick-up tube.

If the V sawtooth signal is not generated by the failure of V sawtooth generator circuit, the H level is not made. Therefore, low(L) level is sent to the high voltage circuit to stop generating the high voltages. If the H flyback pulse is not sent to rectifier D3 due to the failure of H deflection circuit, Q16 turns OFF turning Q17 ON. As a result, the L level is sent to the high voltage circuit to stop generating the high voltages.

8-8 High Voltage Circuit

The pre-blanking (PRE BL) pulse is fed through pin 15 of CN2 to the primary winding of step-up transformer in converter transformer T1 through driver Q34/Q35 to step-up the PRE BL pulse to necessary level.

The boosted pulse obtained at the secondary winding of step-up transformer are rectified to generate high voltage.

The high voltage are derived as follows.

+300V obtained at pin 6 of T1 is fed to grid-2 (G2) of red (R), green (G) and blue (B) pick-up tubes respectively. +1.4KV obtained at pin 5 of T1 is fed to grid-2 (G2) of pick-up tubes. +600V generated dividing +1.4KV with block resistor Z1 is sent to grid-3 (G3). The voltages set by VR17 (R FOCUS), VR18 (B FOCUS) and VR19 (G FOCUS) are sent to grid-4 (G4) of pick-up tubes together with the dynamic focus signal supplied through C80 - C82. -80V obtained at pin 9 of T1 sets by VR20 (G BEAM), VR21 (B BEAM) and VR22 (R BEAM) are fed to grid-1 (G1) together with the feedback beam control signal supplied through R143, R159 and R176. +80V obtained at pin 7 of T1 is fed to the cathode blanking circuit and the target voltage control circuit as a power source.

8-9 Feedback Beam Control Circuit

The R signal is fed through pin 9 of CN1 inverter Q57 and SW2 to amplifier Q58/Q59. The amplified signal at the emitter of Q59 is supplied through buffer Q60 and mixed with the DC voltage which controls the beam of R pick-up tube. VR34 (R FBC CONTROL) adjusts the R signal level sent to the control grid.

Similarly the G and B signal are supplied through pins 11 and 12 of CN1 inverter Q36/Q48, SW2, amplifier Q37/Q38 and Q27/Q48, and buffer Q39 and Q49 and mixed with the DC voltages for controlling the beam of G and B pick-up tubes. As a result, even if the camera is aimed at the scene which contains the excessively bright object, the beam of each pick-up tube is automatically controlled depending upon the brightness of object and the trailing image of each pick-up tube is minimized.

When the SW2 (FEEDBACK BEAM CONTROL SWITCH) is set to OFF position, the R, G and B signal are not sent to the pick-up tubes.

8-10 Cathode Blanking Circuit

The vertical scanning start (Vs) pulse is sent through pin 16 of CN2 to cathode blanking mixer Q51/Q52. The horizontal scanning start (Hs) pulse is also fed through pin 10 of CN2 to cathode blanking mixer Q51/Q52. The mixed signal obtained at the collector of Q51/Q52 is fed to the cathode (K) of each pick-up tube through buffer Q53 - Q55 to eliminate the retrace line of scanning.

8-11 Dynamic Focus Circuit

The mixed signal of positive H and V parabola signal is sent from the H and V parabola generator circuit to amplifier Q44. The inverted and amplified parabola signal at the collector of Q44 is mixed with the focus DC voltages for R, G and B pick-up tubes through C80 - C82 and buffer Q45 and they are sent to G4 of pick-up tubes respectively.

8-12 AIC NAM Control Circuit

The horizontal (H) parabola signal is fed from the H parabola generator circuit to the base of mixer Q25. The vertical parabola signal is fed from the V parabola generator circuit to the base of mixer Q25 and mixed with the H parabola signal. The mixed parabola signal (A) obtained at the emitter of Q25 is fed to amplifier Q26. The DC voltage set by R111 and R113 and the circle gate pulse (B) is generated. The circle gate pulse (B) obtained at the collector of Q26 is sent through buffer Q27 to the base of switcher Q28.

The R, G and B signal are respectively sent to the R, G and B processing circuit in the Process board which confirm the NAM (non-additive mixer) circuit and the highest signal among these signals are non-additively mixed. The NAM signal (F) is sent through pin 3 of CN1 to the base of buffer Q29.

During the negative portion of circle gate pulse (B), Q28 turns OFF and the NAM signal is sent through buffer Q29 to another buffer Q30. However, during the positive portion of circle gate pulse (B), Q28 turns ON and the collector voltage of Q28 becomes +2.5V DC which is generated by +2.5V DC regulator. As a result, Q29 is turned OFF and the NAM signal is not sent out. The gated NAM (G) signal at the emitter of Q30 is supplied through the AIC control circuit.

In this way, the noise which may disturb the automatic iris control is removed.

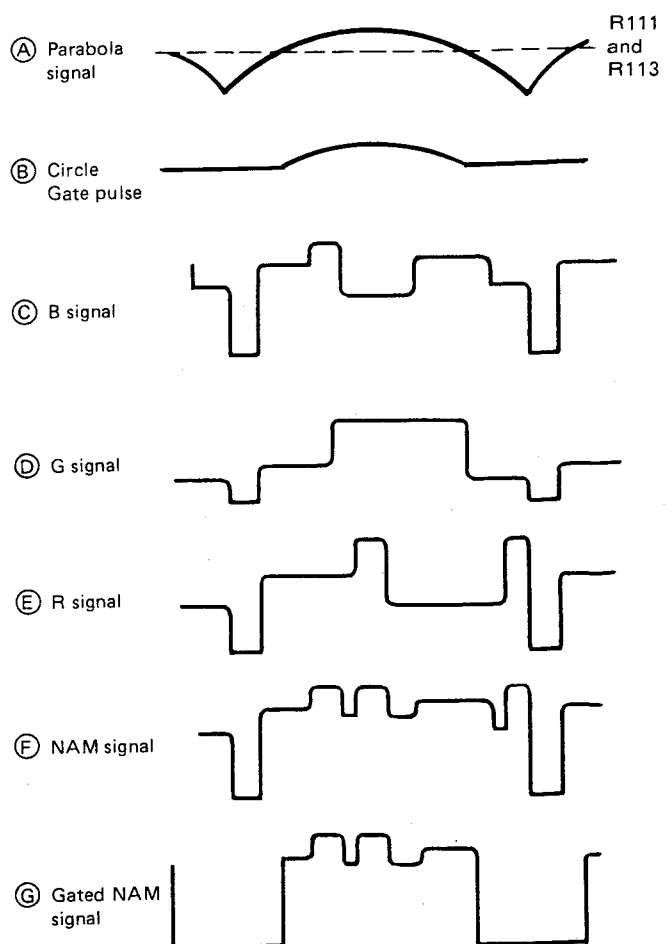


Fig. 8-12-1 NAM Signal

8-13 AIC Control Circuit

- o When the Iris Control Selection Switch on the zoom lens is set to the AUTO position :

In the normal operating condition, the highest signal (NAM signal) among red (R), green (G) and blue (B) signal is fed from the AIC NAM control circuit to the Lens control board through pin 14 of CN2 and the iris is automatically controlled in the lens in reference with the NAM signal.

When the Auto White/Auto Black Set Switch is set to the ABC position or the Color Bar/Camera Selection Switch is set to the BAR position, high (H) level is fed to the base of Q32 and Q32 turns ON. The Q33 and Q33 turns ON and H level is sent through pin 14 of CN2 to the Lens control circuit to close the lens.

The L level at the collector of Q33 is sent to the Lens control board through pin 14 of CN2 to close the lens iris.

In the normal operating condition, +12V is fed to the collector of Q31 and H level is sent to the base of Q31 and Q31 turns ON.

+12V obtained at the emitter of Q31 is supplied to the AIC control circuit.

When the power switch is turned OFF, the base potential of Q33 becomes low level, Q33 turns ON due to change in C1 in VIC 2.

As a result, H level is sent to the Lens control circuit through Q33 and pin 13 of CN2 in order to close the lens. After C1 in VIC 2 is discharged and Q33 turned OFF and no H level is sent to the lens. However, the lens iris remains close.

- o When the remote control unit (RCU) is used and the Iris Control Selection Switch on the zoom lens is set to the REM (remote) position :

When the Lens Iris Control on the RCU is set to the AUTO position, L level is fed from the Auto (A) board through pin 1 of CN7 to the base of Q20 and Q20 turns OFF. H level obtained at the collector of Q20 is fed to base of Q21/Q23 and Q21 turns ON and Q23 turns OFF.

H level is fed from RCU through pin 8 of CN2 to pin 2 of amplifier IC3(a). H level obtained at pin 1 of IC3(a) is sent to the collector of Q22. L level at the collector of Q21 is fed to the base of Q22 and Q22 turns ON. The NAM signal is sent from the AIC NAM control circuit to negative input (pin 6) of amplifier IC3(b). The amplified signal at pin 1 of IC3(b) is sent to pin 3 of another amplifier IC4(a). The amplified signal at pin 1 of IC4(a) is rectified by D7 and C54 into the DC voltage.

The DC voltage corresponding to the NAM signal is sent through pins 5 and 7 of amplifier IC4(b), Q23 and pin 13 of CN2 to the Lens control circuit as a DC voltage which controls the lens iris automatically corresponding to the incoming light intensity.

When the incoming light intensity increases, the NAM signal level also goes up. At this time, the DC voltage at pin 7 of IC3(b) is decreased. The decreased DC voltage is fed to the Lens control board to reduce the iris opening. When the incoming light intensity decreases, the reverse operation takes place.

In this way, the iris of zoom lens is controlled automatically corresponding to the incoming light intensity and the video signal level from the camera is maintained in constant regardless of incoming light intensity. VR16 (IRIS SET) is a control to set the automatic iris level.

When the Lens Iris Control on the RCU is set to the MANUAL position, L level is fed from the Auto (A) board through pin 1 of CN7 to the base of Q20 and Q20 turns OFF. H level obtained at the collector of Q20 is fed to base of Q21/Q23 and Q21 turns ON and Q23 turns OFF.

L level is fed from RCU through pin 8 of CN2 to pin 2 of amplifier IC3(a). L level at the collector of Q21 is fed to the base of Q22 and Q22 turns ON. L level obtained at pin 1 of IC3(a) is sent through pin 13 of CN2 to the Lens control board. As a result, DC voltage which is set by the Lens Iris Control on the RCU is sent to the Lens control board through pin 13 of CN2 to control lens iris manually.

When the Auto White/Auto Black Set Switch is set to the ABC position, or the Color Bar/Camera Selection Switch is set to the BAR position, H level is fed from the Auto (A) board through pin 3 of CN6 to the base of Q24 and Q24 turns ON. As a result, L level at the collector of Q24 is sent through pin 13 of CN2 to the Lens control board to close the lens iris.

8-14 Battery Warning Circuit

The DC voltage set by VR31 (BATTERY WARNING) is set to pin 2 of IC7, where it is compared with reference DC voltage set by R200. If the DC voltage at pin 2 is higher than the reference voltage, the output at pin 1 becomes high (H) level. However, if the +12V DC from the battery pack reduces and DC voltage at pin 2 is lower than the reference voltage, the potential becomes low (L) level. It is sent through pin 5 of CN7 to the Auto (A) board and the blinking. "BATT" is displayed in the 1.5 inch viewfinder, it's in order to indicate to the camera operator that another battery pack is required. VR31 (BATTERY WARNING) is a control to set the warning level.

9 Auto Tracing White-Balance (ATW) Board

This circuit automatically sets the white balance of picture by tracing the change of white balance due to the color temperature variation when the white balance selection switch is set to the ATW position. Even if the camera is panned from the indoor to the outdoor or vice versa during the recording, the white balance is automatically changed by detecting the color temperature.

The color temperature is detected by the front-mounted three photo-diodes and the detected signal controls the red and blue signal amplitude in order to maintain the proper white balance of the picture. When the camera is shifted from the indoor to the outdoor for example, the red gain is increased and blue gain is decreased.

The operative range of auto tracing white-balance (ATW) is from about 2000°K to 6500°K.

The photo-diodes which are built into auto tracing white-balance (ATW) sensor IC1 converts the intensity of red (R), green(G) and blue (B) light into the DC voltage and they are obtained at pins 1, 2 and 3 of IC1 respectively. The DC voltage from IC1 increases if the light intensity decreases.

The R, G and B DC voltages corresponding to the R, G and B light intensity are fed through CN1 to comparator/differential amplifier IC29(a) and IC2(b) and they are compared. The DC voltages at the output of IC2(a) and IC2(b) are then sent through amplifiers IC3(a)/IC3(b) and CN18 to pin 6 of comparator IC1(b) and pin 2 of comparator IC1(a) in VIC 2 on the Mother board respectively.

The compared DC voltage is sent through pins 6 and 7 of VIC 2, pins 17 and 9 of CN14, pins 3 and 11 of CN2 and matrix circuit IC25 and IC27 in the Auto (A) board to microprocessor IC21 in the Auto (A) board. The R and B signal are sent from the Process board to the Auto (B) board through CN1 and CN5 on the Mother board. The R and B signal are selected in the Auto (B) board and the selected R or B signal is then sent to microprocessor IC21 in the Auto (A) board. The R or B gain control signal is sent from the Auto (A) board through the Auto (C) board and pins 3 and 4 of VIC 2 in the Mother board to pins 3 and 5 of comparator IC1 in VIC 2.

If the B signal is higher than B gain control signal, the output of IC1 in VIC 2 is high (H) and the microprocessor IC21 in the Auto (A) board instructs the count down digital code to D/A converter Z1 in Auto (A) board for reducing the B gain in the Process board through the auto control circuit in the Auto (C) board. If the B signal is lower than B gain control signal, the output of IC1 in VIC2 is low (L) and the microprocessor IC21 in the Auto (A) board instructs the countup digital code to D/A converter Z1 in the Auto (A) board for increasing the B gain in the Process board. The Rgain in the Process board is also controlled as similar way. The adjustment for B and R are alternately carried.

If the color temperature of scene changes from 3200°K (indoor) to 5100°K (outdoor) for example, the DC voltage at pin 1 of IC1 increases and that pin 3 decreases. These DC voltages are sent to IC2 and the DC voltage at pin 1 and pin 7 of IC2 increase respectively.

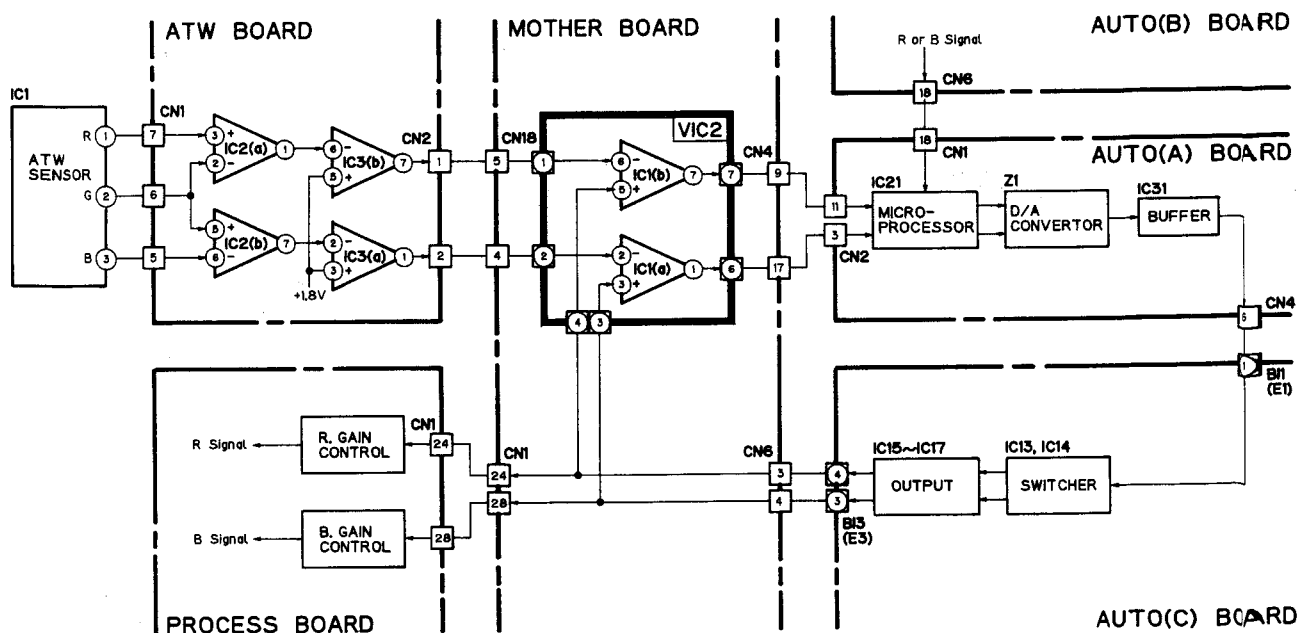


Fig. 9-1-1 ATW Circuit

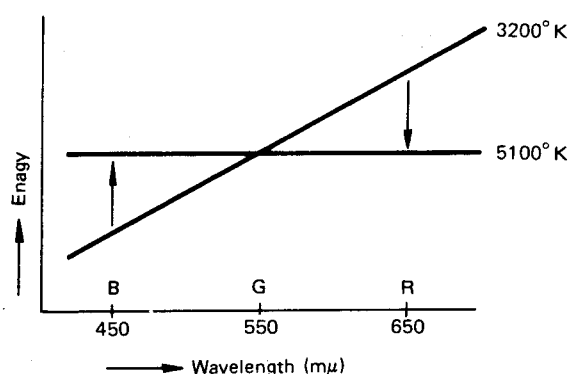


Fig. 9-1-2 Change of Color Temperature

The DC voltage at pin 1 of IC2(a) is then fed through IC3(b).

Therefore, the DC voltage supplied to R gain control amplifier decreases.

However, as the DC voltage at pin 7 of IC2(b) is fed through IC3(a). The DC voltage supplied to B gain control amplifier increases.

In this way, the amplitude of R signal is increased and that of B signal is decreased automatically to obtain proper white balance.

The change of DC voltages detected by photo-diode do not correspond to that of the signal output from integral pick-up tubes when the color temperature changes. In order to coincide both characteristic and to maintain the accurate white balance against color temperature variation, the DC voltage from the amplifier IC3 is extended and suppressed. The DC voltage which controls the R gain is extended by Q1 and Q2 and the DC voltage for the B gain is suppressed by Q3 and Q4.

The DC voltages which are set by VR2 (R ATW ADJ) and VR1 (B ATW ADJ) and fed through regulator IC2(d) and IC2(c) to IC2(a) and IC2(b) set the white balance at 3200°K color temperature.

VR4 (R GAIN) and VR5 (B GAIN) adjust the white balance at 5100°K color temperature.

10 Audio Board

10-1 Audio Amplifier Circuit

The -70dB audio signal picked up by the microphone connected to the MIC connector CN3 or CN9 is fed to pin 1 of CN2. The audio signal is fed to amplifier IC1(a); fade control Q1/Q2 and IC1(b) and amplified -50dB. The -20dB audio signal obtained at pin 7 of IC1(b) is sent to pin 4 of IC2(a). The potential at control terminal (pin 9) of IC2(a) becomes low (L) level.

The terminal pin 4 is connected terminal pin 1. The -20dB audio signal obtained at pin 1 of IC2(a) is sent through pin 5 of CN6 and pin 3 of VTR connector CN7 to the VTR for recording.

When the SW3 (Audio Level Selection Switch) is set to -60dB position, the amplified audio signal obtained at pin 4 of IC1(a) is sent through fade control Q1 and Q2 to pin 7 of IC2(a). The potential at control terminal (pin 9) of IC2(a) becomes high (H) level. The terminal pin 7 is connected terminal pin 1. The -60dB audio signal obtained at pin 1 of IC2(a) is sent through pin 5 of CN6 and pin 3 of VTR connector CN7 to the VTR for recording.

The audio signal is also sent to pin 5 of IC2(a). The potential at control terminal (pin 8) of IC2(a) becomes L level. The terminal pin 5 is connected terminal pin 3. The audio signal obtained at pin 3 of IC2(a) is sent through amplifier Q3/Q4, fade control Q5 and pin 1 of CN1 to the Audio Monitor Jack CN4.

The audio signal level is also controlled by Q1/Q2 control signal supplied from the Process board.

10-2 VTR Alarm Circuit

When the VTR is set in the recording mode and if VTR servo control is disturbed or tape is reached to end. The VTR/REC Alarm warning pulse is fed to the base of Q8 from the portable VTR. The pulse at Q8 is sent to pin 3 of comparator IC3(a), where it is compared with reference DC voltage dividing R41/R42. The Alarm pulse obtained at pin 1 of IC3(a) is sent through pin 6 of B13(E3) to the Auto (A) board and the blinking "VTR" is displayed in the 1.5 inch viewfinder, it s in order to indicate to the camera operator.

10-3 Battery Alarm Circuit

If the +12V DC from the VTR battery pack reduces, the VTR battery warning pulse at pin 19 of IC2(b) supplied from VTR.

When the SW1 (VTR Selection Switch) is set to 14P position, the potential at control terminal (pin 11) of IC2(b) becomes high (H) level. The terminal pin 11 is connected terminal pin 13. The battery warning pulse obtained at pin 13 of IC2(b) is sent through buffer Q9 to pin 5 of comparator IC3(b), where it is compared with reference DC voltage dividing R50/R51.

The battery warning pulse obtained at pin 7 of IC3(b) is sent through pin 6 of B13 (E3) to the Audio (A) board and the blinking "BATT" is displayed in the 1.5 inch viewfinder, it s in order to indicate to the camera operator.

11 1.5" Viewfinder WV-VF34

11-1 +4.8V Regulator Circuit

The +4.8V DC voltage is generated by regulating +8.6V DC power using IC1(a), Q2 and Q3 in the EVF Sub-board.

The output voltage of Q2/Q3 is applied to pin 2 of IC1(a) to form a feedback loop, and thus stabilizing the output voltage. The reference voltage for pin 3 is obtained by dividing the +8.6V using R3 and R4. Q1 is a control for standby operation. When the Standby Operate Selection Switch is set to the STANDBY position, the potential at pin 5 of CN1 becomes high (H) level. H level is sent to the base of Q1 and Q1 turns ON and the power supply for IC1(a) (pin 1) becomes 0V at STANDBY position.

11-2 Video Amplifier Circuit

The video signal is sent from pin 1 of CN1 to the video amplifier in IC2 through pin 18 of IC2. The amplified signal is fed to the video mix circuit where it is mixed with the vertical blanking (V BL) pulse from the V oscillator circuit. The mixed signal whose level is set by VR3 (CONTRAST) is fed through Q7, C18 and pin 4 of E2 to the grid-1 (G1) of CRT.

The DC voltage set by VR4 (BRIGHTNESS) and VR5 (SUBBRIGHTNESS) is mixed with the video signal through R27 and sent to G1.

11-3 Horizontal Deflection Circuit

The video signal is fed to the sync separator in IC2 where the sync signal of video signal is separated. The separated sync is fed to the phase comparator where the phase of horizontal (H) sync signal is compared with the H sawtooth signal which is generated from the H flyback pulse at pin 20 of IC2 with integrator consisting of R6, R7, C9 and C8 and sent through pin 19 of IC2. The phase difference between two signals is converted into the DC potential and it is sent to the H oscillator to control the oscillating frequency. As a result, the H oscillator oscillates the signal whose frequency and phase match to those of H sync signal. VR2 (AFC ADJ) is a control for setting the oscillation frequency in a steady state.

The H pulse is then fed to H deflection output Q8 through C14, R25/L1, L2 (H.SIZE) and pin 2 of CN5 to the H deflection coil. The H flyback pulse obtained at the collector of Q8 is sent to the high voltage circuit.

11-4 Vertical Deflection Circuit

The video signal is fed through pin 18 of sync separator in IC2 where only the sync signal is separated. The separated sync signal is then sent to the vertical (V) sync separator in IC2 and the V sync signal is detected. The V sync signal is fed to the V oscillator to trigger it and the V oscillator oscillates the V sawtooth signal. The V sawtooth signal is then fed through V deflection drive circuit and pin 3 of IC2 to the V deflection coil. +4.8V DC is fed to V deflection drive circuit through the V reference generator in IC2 as a reference voltage. VR1 (V SIZE) is a control for adjusting V scanning size.

11-5 High Voltage Circuit

The flyback pulse generated in the horizontal (H) deflection circuit is supplied to primary winding of the flyback transformer (FBT) in the high voltage pack T1 to step up the flyback pulse to necessary level.

The boosted pulse obtained at the secondary winding of FBT are rectified to generate high voltages.

+5KV obtained by rectifying the boosted pulse is fed to the CRT anode. +650V obtained at pin 6 of T1 is divided by VR6 (FOCUS), R28 and R29. The DC voltage set by VR6 is fed to the grid-3 (G3) of CRT. Approximately +120V obtained at cross point of R28 and R29 is fed to the grid-2 (G2) of CRT. -55V obtained at pin 5 of T1 is sent to Q7 as a power source. The voltage set by VR4 (BRIGHTNESS) is fed to grid-1 (G1) together with video signal supplied from the video amplifier circuit. The heater voltage for CRT is fed from the +4.8V DC regulator circuit in the Deflection board.

Service Manual

Vol. 2

Adjustment Procedures

**PAL Colour Video Camera
WV-V3 Series**

CONTENTS

1. Test Equipment Required	2-1
2. Disassembling Procedure for Adjustment	2-2
2-1 Camera	2-2
2-2 Lens Grip	2-2
2-3 1.5" Viewfinder	2-2
3. Pick-up Tube Replacement	2-3~2-6
3-1 Blue Pick-up Tube Replacement	2-3~2-4
3-2 Green Pick-up Tube Replacement	2-4~2-5
3-3 Red Pick-up Tube Replacement	2-6
4. Disassembling Procedure for Lens WV-LZ33/10	2-7~2-8
5. Adjustment Procedure	2-9~2-36
5-1 Connection and Setting Up for Adjustment	2-9
5-2 Power Supply and Sync Adjustment	2-10
5-3 Color Bar Adjustment	2-10~2-12
5-4 Deflection Adjustment	2-13~2-22
5-5 Preamplifier Adjustment	2-22~2-23
5-6 Process Adjustment	2-23~2-32
5-7 Auto Board Adjustment	2-33
5-8 Lens Control Adjustment	2-33~2-34
5-9 Auto Tracing White-Balance Adjustment	2-34~2-35
5-10 1.5" Viewfinder Adjustment WV-VF33	2-35~2-36
6. Location of Test Points and Adjustment Controls	2-37~2-39
7. Chip Components	2-40~2-41

Test equipment denoted by shaded outlines are not required if only pick-up tubes are replaced.

1. Test Equipment Required

The following test equipment is required for adjustment of color video camera model WV-V3.

- o Oscilloscope
(dual trace, delayed sweep, 30MHz band width, with three probes.)
- o Digital voltmeter (DVM)
- o Signal generator or special effects generator
- o Crosshatch pattern generator
- o Frequency counter
- o Vectorscope
- o Waveform monitor
- o Color video monitor
- o Monochrome underscanned video monitor
- o Tripod mounting adaptor (WV-Q36)
- o Tripod
- o AC adaptor (WV-PS31) or DC power (12V, 2.5A or more)
- o Lighting (1400 lux, 3200eK)
- o Logarithmic gray scale chart (Part No. YWV2310-RB99)

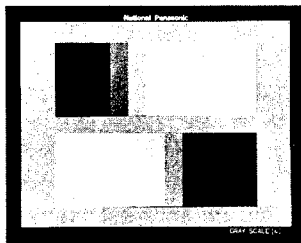
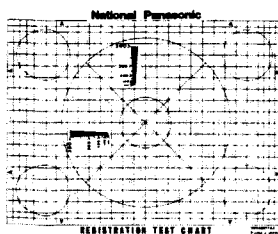


Fig. 1-1

- o Registration chart (Part No. YFV8RA0011A3)



Front



Rear

Fig. 1-2

- o Linearity chart (Part No. YFEIALIN-E)

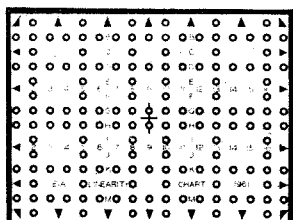


Fig. 1-3

- o In-mega cycle test chart (Part No. YFINMEGA-K)

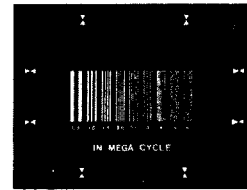


Fig. 1-4

- o Color chart (Part No. YWV2100RB98)

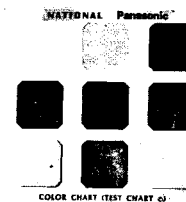


Fig. 1-5

- o Filters for adjustments of Auto Tracing White-Balance.

	Parts No.	Description
KODAK	80B	More than 10 x 20 cm (1 sheet)
FUJI	LBB-12	More than 10 x 20 cm (1 sheet)
KENKO	LB-120	More than 62 mmφ (2 pieces)
HOYA	LB-120	More than 62 mmφ (2 pieces)
NIKON	B12	More than 62 mmφ (2 pieces)

- o Luxmeter

We recommend one of the following.

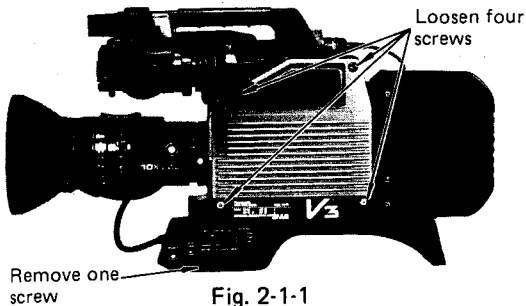
- A. Portable Luxmeter Model No. 2381 by Yokogawa Electric Workers.
- B. Electronic Foot Candle Meter by Pax Lux.

2. Disassembling Procedure for Adjustment

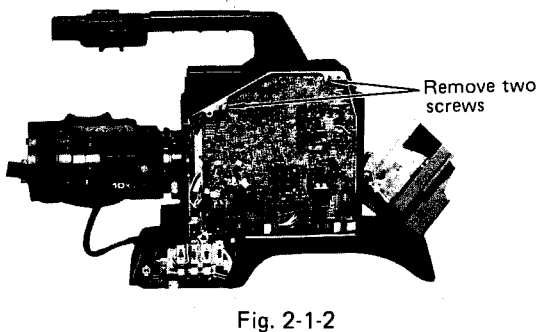
2-1 Camera

- o Loosen four screws and remove one screw which hold side cover and remove the side cover.

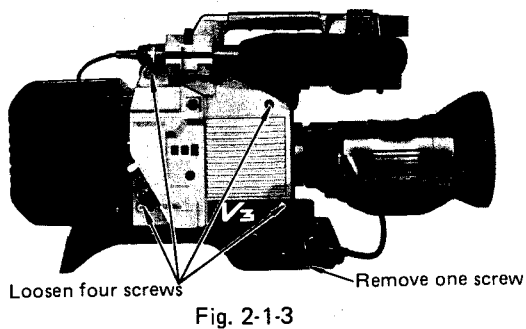
(A) For right side cover (viewed from the front) (Fig. 2-1-1)



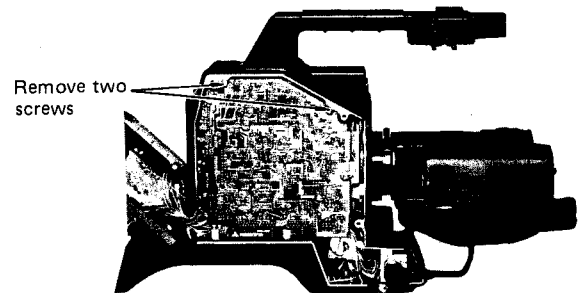
- o Remove two screws which hold the Deflection board. (Fig. 2-1-2)



(B) For left side cover (viewed from the front) (Fig. 2-1-2)

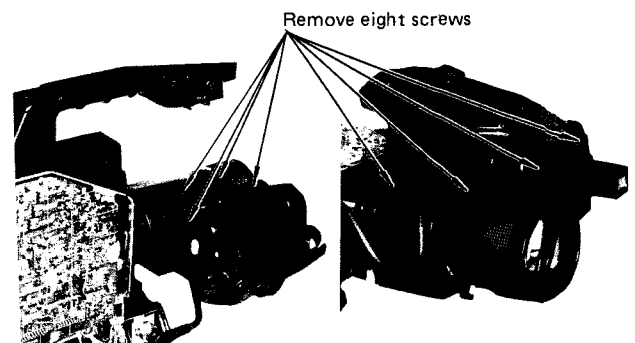


- o Remove two screws which hold the Process board. (Fig. 2-1-4)



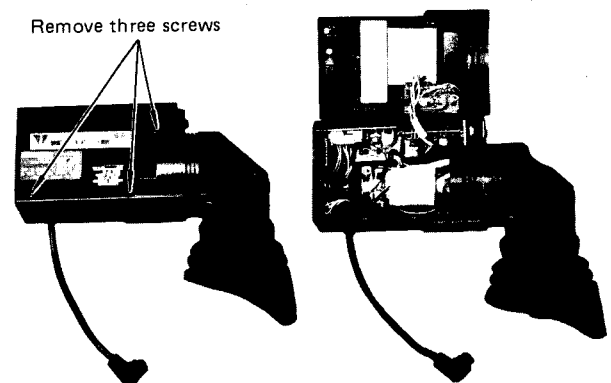
2-2 Lens Grip

- o Remove eight screws which hold the grip cover and remove the grip cover. (Fig. 2-2-1)



2-3 1.5" Viewfinder

- o Remove three screws which hold the lower cover and remove the lower cover. (Fig. 2-3-1)



3. Pick-up Tube Replacement

- o Disassemble the camera while referring to 2 Disassembling Procedure for Adjustment on page 2-2.

3-1 Blue Pick-up Tube Replacement

- o Remove three screws which hold the upper handle cover and remove the upper handle cover. (Fig. 3-1-1)

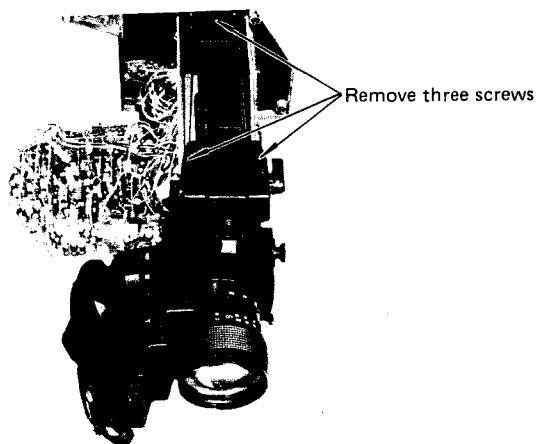


Fig. 3-1-1

- o Remove three screws which hold the handle and remove the handle. (Fig. 3-1-2)
- o Disconnect three connectors. (Fig. 3-1-2)

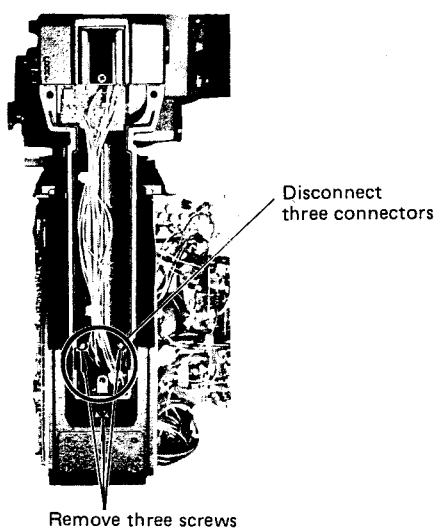


Fig. 3-1-2

- o Remove eight screws which hold the upper cover. (Fig. 3-1-3)

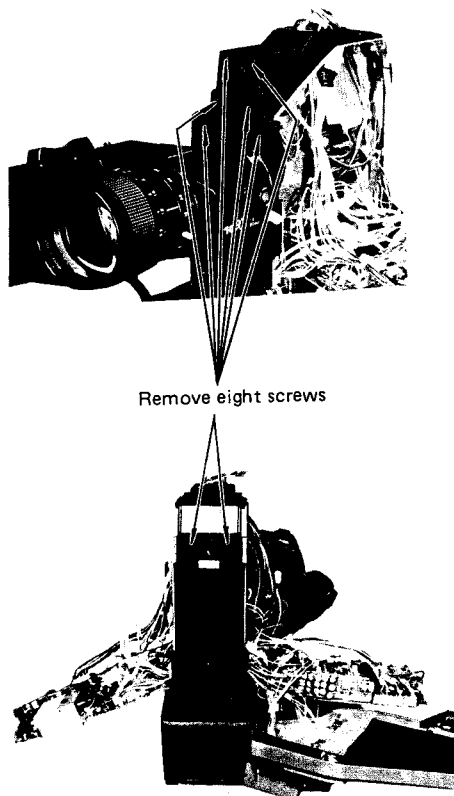


Fig. 3-1-3

- o Remove two screws which hold the Auto (A) and (B) board. (Fig. 3-1-4)

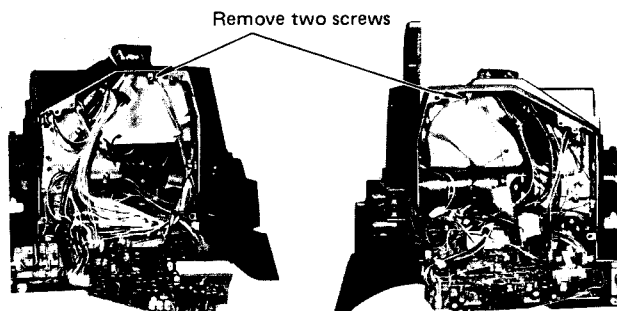


Fig. 3-1-4

- o Remove one screw which hold the ground wire. (Fig. 3-1-5)
- o Unsolder the ground wire. (Fig. 3-1-5)

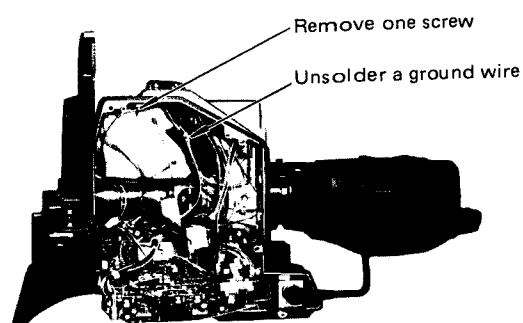


Fig. 3-1-5

- o Remove two screws which hold the shield cover A and B and remove the shield cover A and B. (Fig. 3-1-6)

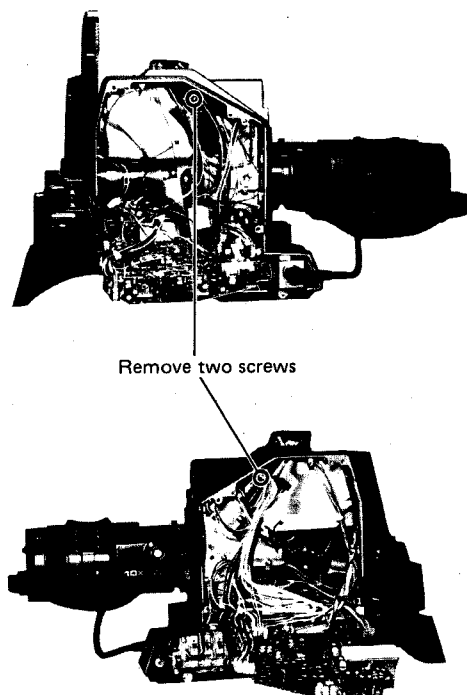


Fig. 3-1-6

- o Disconnect the tube socket from the pick-up tube for blue channel. (Fig. 3-1-7)
- o Remove the tube holding ring by turning it counter-clockwise. (Fig. 3-1-7)
- o Pull the tube out from the deflection coil. (Fig. 3-1-7)

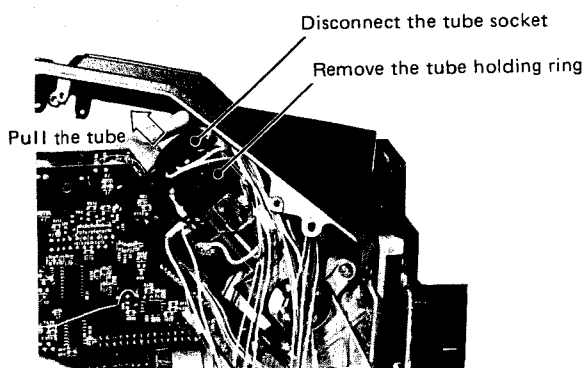
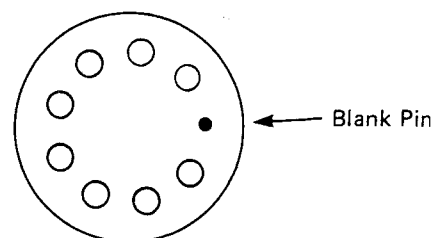


Fig. 3-1-7

- o Clean the faceplate of new tube (Part No. S4701A for blue) with the lens cleaning tissue or cloth.
- o Insert the new pick-up tube into the deflection coil and push it completely until it stops.

Note : 1. When inserting the tube in place, be careful not to expose the target directly to bright light.

2. Make sure that the pick-up tube is positioned correctly, i.e., the blank pin portion of tube positions right (Process board side as shown below. (Fig. 3-1-8))



Viewed from rear

Fig. 3-1-8

- o Install the tube holding ring and tighten it to secure the pick-up tube.
- o Seat the tube socket to the blue pick-up tube.

3-2 Green Pick-up Tube Replacement

- o Remove three screws which hold the shoulder pad and remove the shoulder pad. (Fig. 3-2-1)

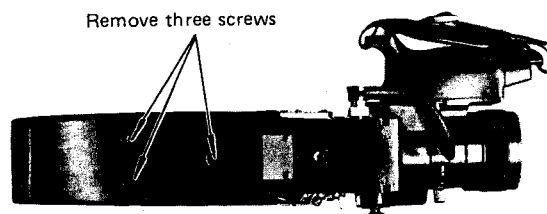


Fig. 3-2-1

- o Remove four screws which hold the rear panel and remove the rear panel. (Fig. 3-2-2)

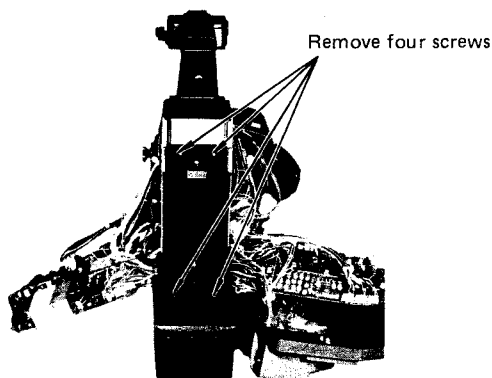


Fig. 3-2-2

- o Unsolder the ground wire. (Fig. 3-2-3)

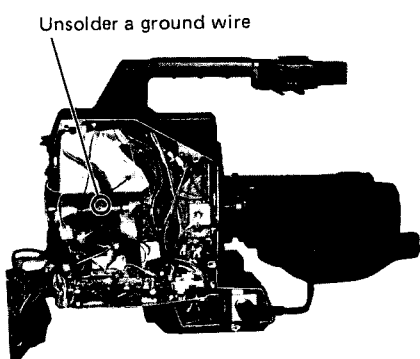


Fig. 3-2-3

- o Remove two screws which hold the shield cover A and B and remove the shield cover A and B. (Fig. 2-1-3)

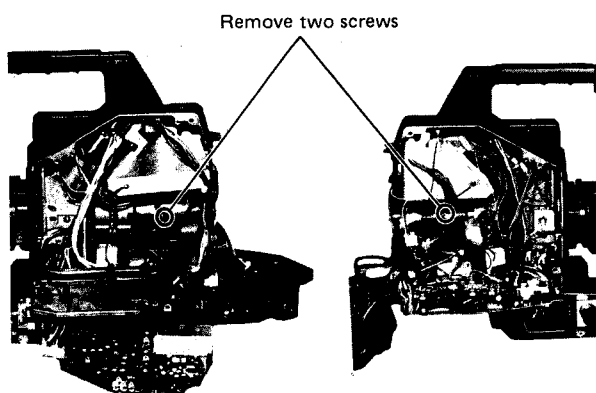


Fig. 3-2-4

- o Disconnect the tube socket from the pick-up tube for green channel. (Fig. 3-2-5)
- o Remove the tube holding ring by turning it counter-clockwise. (Fig. 3-2-5)
- o Pull the tube out from the deflection coil. (Fig. 3-2-5)

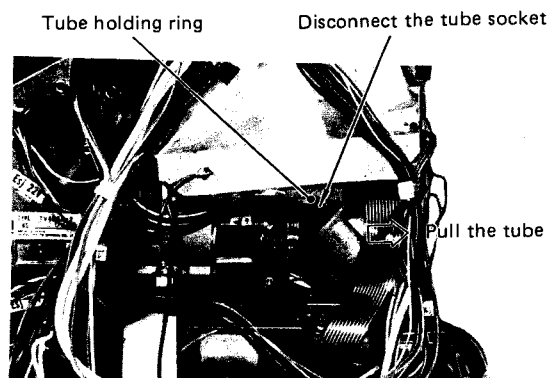
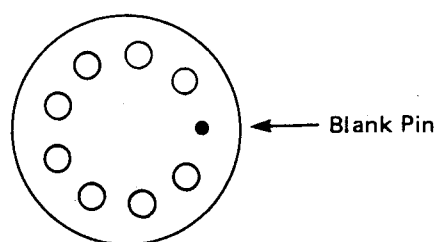


Fig. 3-2-5

- o Clean the faceplate of new tube (Part No. S4701A for green) with the lens cleaning tissue or cloth.
- o Insert the new pick-up tube into the deflection coil and push it completely until it stops.

Note : 1. When inserting the tube in place, be careful not to expose the target directly to bright light.
2. Make sure that the pick-up tube is positioned correctly, i.e., the blank pin portion of tube positions right (Process board) side as shown below. (Fig. 3-2-6)



Viewed from rear

Fig. 3-2-6

- o Install the tube holding ring tighten it to secure the pick-up tube.
- o Seat the tube socket to the green pick-up tube.

3-3 Red Pick-up Tube Replacement

- o Remove three screws which hold the shoulder pad and remove the shoulder pad. (Fig. 3-3-1)
- o Remove two screws which hold the lower panel and remove the lower panel. (Fig. 3-3-1)

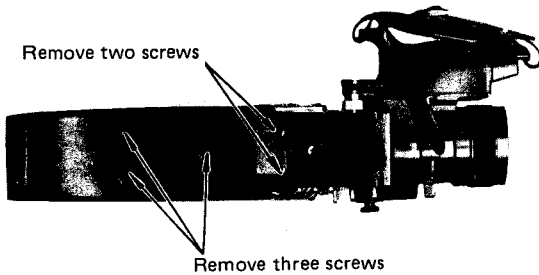


Fig. 3-3-1

- o Remove two screws which hold the switch board and remove the switch board. (Fig. 3-3-2)

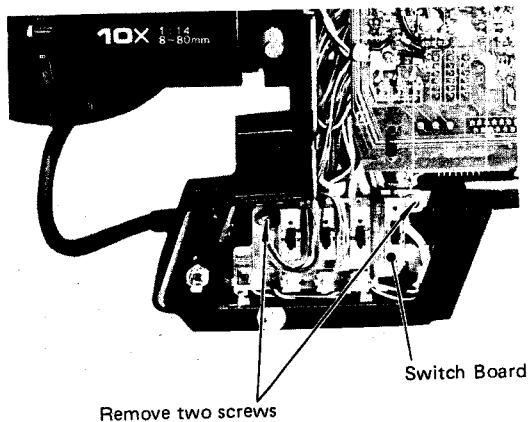
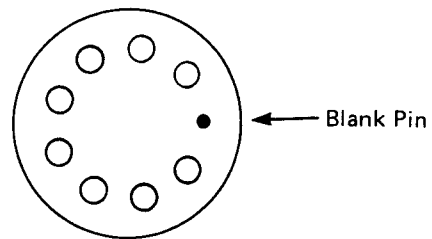


Fig. 3-3-2

- o Disconnect the tube socket from the pick-up tube for red channel.
- o Remove the tube holding ring by turning it counter-clockwise.
- o Pull out the pick-up tube from the deflection coil.

- o Clean the faceplate of new tube (Part No. S4701A for red) with the lens cleaning tissue or cloth.
- o Insert the new tube into the deflection coil and push it completely until it stops.

Note : 1. When inserting the pick-up tube in place, be careful not to expose the target directly to bright light.
2. Make sure that the pick-up tube is positioned correctly, i.e., the blank pin portion of tube positions right (Process board) side as shown below. (Fig. 3-3-3)



Viewed from rear

Fig. 3-3-3

- o Install the tube holding ring and tighten it to secure the pick-up tube.
- o Seat the tube socket to the red tube.

4. Disassembling Procedure for Lens

- o Remove eight screws which hold the grip cover and remove the grip cover. (Fig. 4-1)

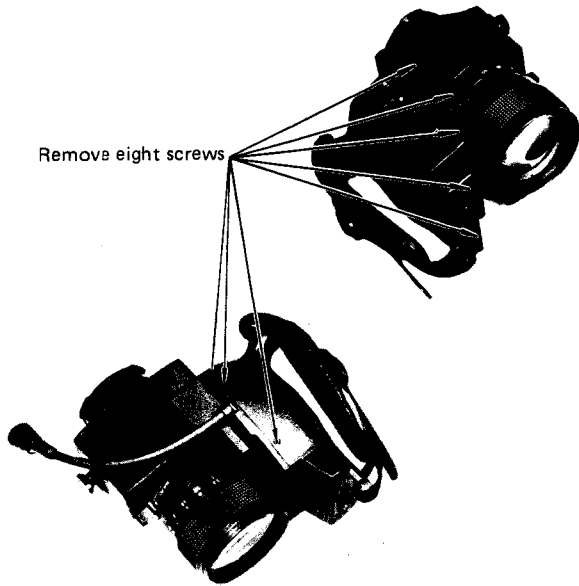


Fig. 4-1

- o Disconnect three connectors CN2, 3 and 6 on the Lens control board. (Fig. 4-2)

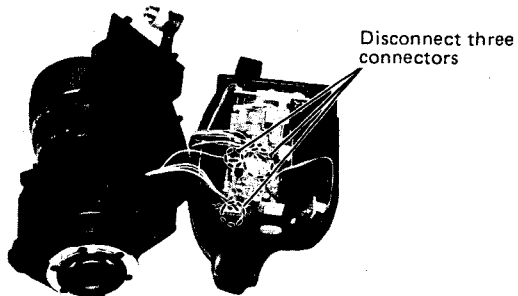


Fig. 4-2

- o Remove three screws which hold the grip base and remove the grip base. (Fig. 4-3)

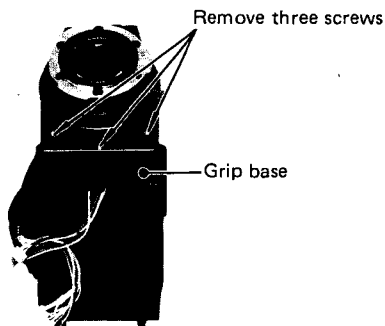


Fig. 4-3

- o Remove six screws which hold the mounting angle and remove the mounting angle. (Fig. 4-4)

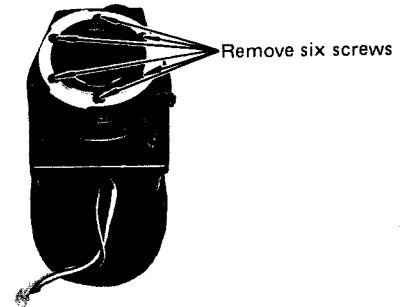


Fig. 4-4

- o Remove the flange back adjusting ring and remove four screws which hold the lens mounting assembly and remove the lens mounting assembly. (Fig. 4-5)

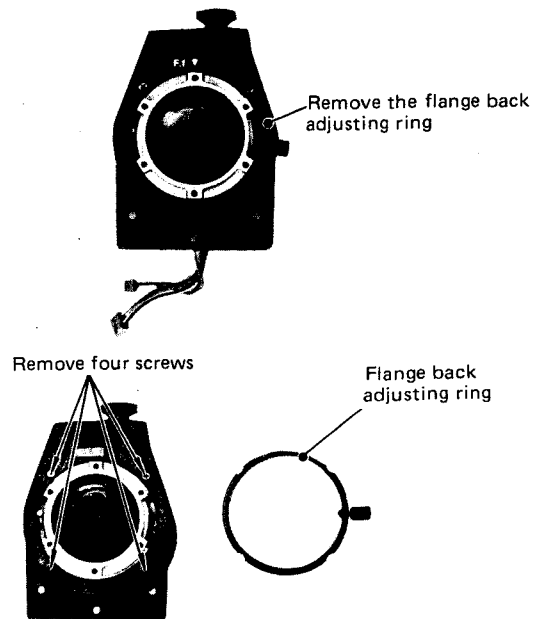


Fig. 4-5

- o Remove three screws which hold the IRIS AUTO/MANUAL switch assembly and remove the IRIS AUTO/MANUAL switch assembly. (Fig. 4-6)

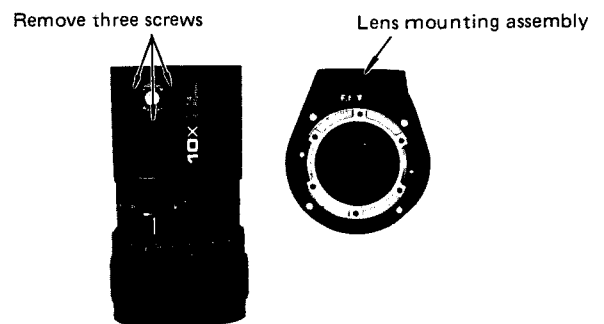


Fig. 4-6

- o Remove two screws which hold the zoom motor assembly and remove the zoom motor assembly. (Fig. 4-7)

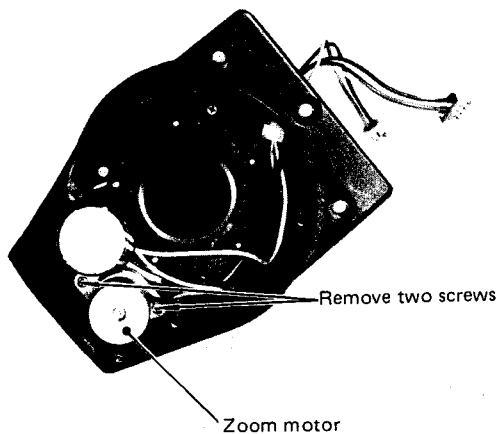


Fig. 4-7

- o Remove three screws which hold the lens iris assembly and remove the lens iris assembly. (Fig. 4-8)

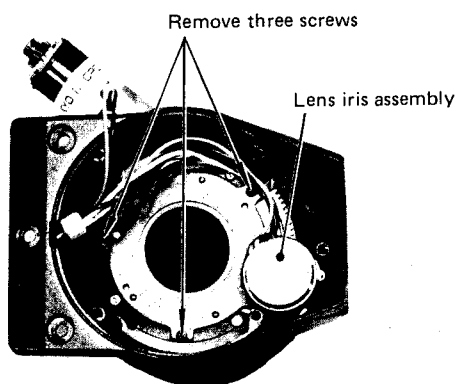


Fig. 4-8

- o Remove four screws which hold the lens cover and remove the lens cover. (Fig. 4-9)

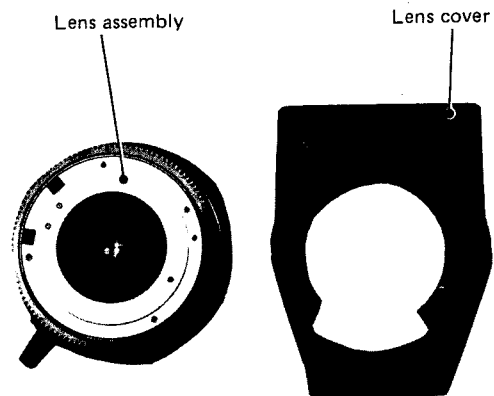
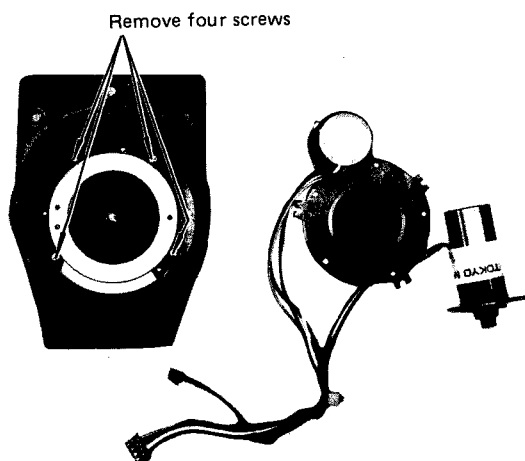


Fig. 4-9

- o After replacing the parts, reinstall the lens in order of disassembly procedure.
- o When changing the lens mounting assembly, clean the lens with lens cleaning tissue or cloth.

5. Adjustment Procedure

5-1 Connection and Setting Up for Adjustment

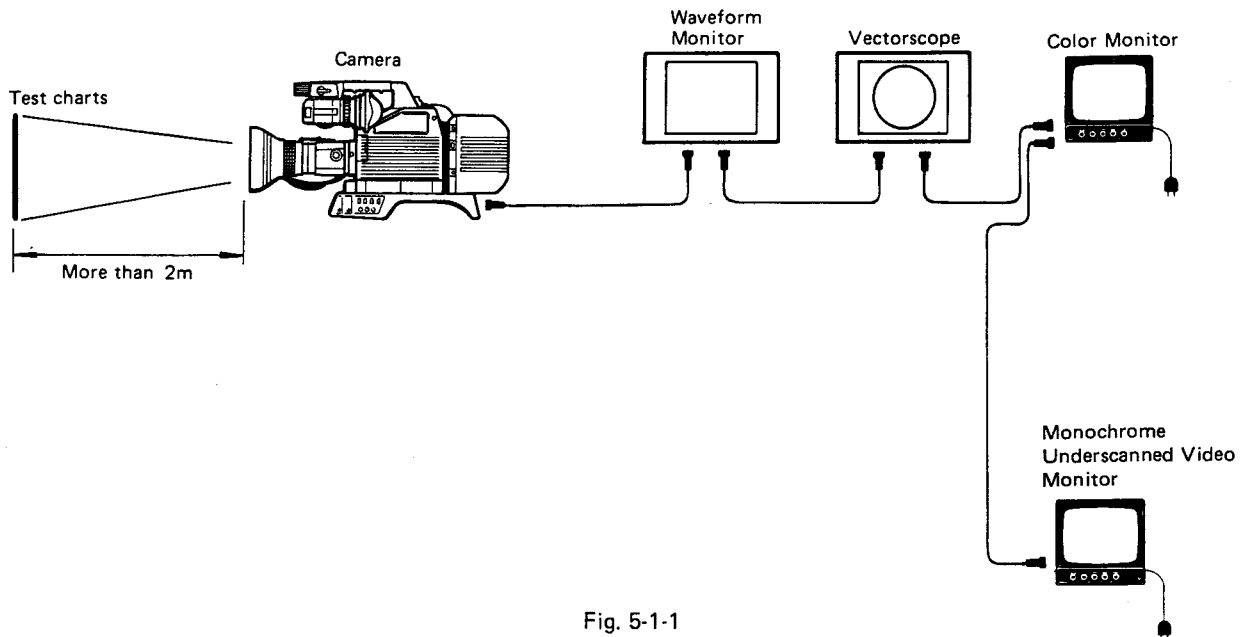


Fig. 5-1-1

Connection

- o Connect the VIDEO OUTPUT connector on the left side of camera to the VIDEO INPUT connector of monochrome underscanned video monitor through the waveform monitor, vectorscope and color video monitor using a coaxial cable.
- o Terminate the video input of monochrome underscanned monitor with 75 ohms.

Set-up

- o Turn ON the camera for at least 30 minutes prior to adjustment.
- o Distance between the camera and test chart should be more than 2m.
- o Light : 1400 lux incident, 3200°K.

Position of Controls and Switches on the camera

(Right Side) - Viewed from front -

Filter Wheel

High Gain Selection Switch

Standby/Operate Selection Switch

Color Bar/Camera Selection Switch

White Balance Selection Switch

Level Indicator ON/OFF Switch

(Left Side) - Viewed from front -

Negative/Positive Selection Switch

(Rear Side)

Power Switch

(Lens)

Iris Selection/Manual Control Knob

1 Wheel

0 dB

OPERATE

CAMERA

P SET

OFF

POSI

POWER BATT

MANUAL

5-2 Power Supply and Sync Adjustment

(a) Switching frequency adjustment

Test points :	TP4 (SW FREQ.)	Deflection board
	TPG (GROUND)	Deflection board
Adjust :	VR29	Deflection board
	(SWITCHING FREQ.)	

- o Connect the frequency counter to TP4 (SW FREQ.) and TPG (GROUND) on the Deflection board.
- o Adjust VR29 (SWITCHING FREQ.) for 120KHz $\pm$ 0.2KHz.

(b) +4.8V adjustment

Test points :	TP6 (+4.8V)	Deflection board
	TPG (GROUND)	Deflection board
Adjust :	VR30 (+4.8V ADJ)	Deflection board

- o Connect the digital voltmeter (DVM) probe between TP6 (+4.8V) and TPG (GROUND) on the Deflection board.
- o Adjust VR30 (+4.8V ADJ) for $+4.8V \pm 0.01V$.

(c) Battery warning adjustment

Test points :	Pin 4 (+) of CN6	DC 4P Connector
	Chassis (GROUND)	DC 4P Connector
Adjust :	VR31	Deflection board
	(BATTERY WARNING)	

- o Connect the DVM probe between +DC OUT of DC power supply and the ground.
- o Disconnect the AC adaptor WV-PS31 from the camera.
- o Supply +12V DC between pin 4 and pin 1 (GROUND) of EXT DC INPUT on the side of the camera from the DC power supply.

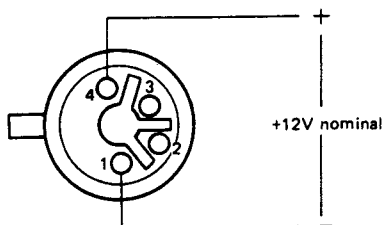


Fig. 5-2-1

- o Set the DC power supply voltage so that voltage is 10.5V.
- o Turn VR31 (BATTERY WARNING) fully counter-clockwise and turn it back slowly and stop it when the battery warning indicator (BATT) in the 1.5" electronic viewfinder just blinks.
- o Confirm that the battery warning indicator (BATT) turns OFF when the DC power supply voltage is 10.7V.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced

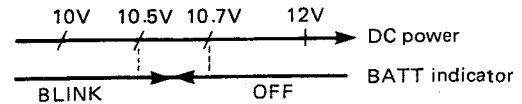


Fig. 5-2-2

- o Disconnect the DC power supply from the EXT DC INPUT of the camera.
- o Mount the AC adaptor WV-PS31 to the camera.

(d) 4.43MHz adjustment

Test point :	TP1 (SC)	Sync board
Adjust :	CT1	Sync board
	(4.43MHz ADJ)	

- o Connect the frequency counter to TP1 (SC).
- o Adjust CT1 (4.43MHz ADJ) for 4,433,619Hz $\pm$ 10Hz.

5-3 Color Bar Adjustment

- o Set the SW1 (COLOR BAR/CAMERA SELECTION SWITCH) to the BAR position.

(a) Color bar width adjustment

Test point :	VIDEO OUT
Adjust :	VR7 (BAR WIDTH) Process board
Observe :	Waveform monitor

- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Trigger the oscilloscope at H rate (Use TP4 (HD), Deflection board.).
- o Adjust VR7 (BAR WIDTH) so that the end of black bar portion coincides with the beginning of the horizontal blanking. (Fig. 5-3-1)

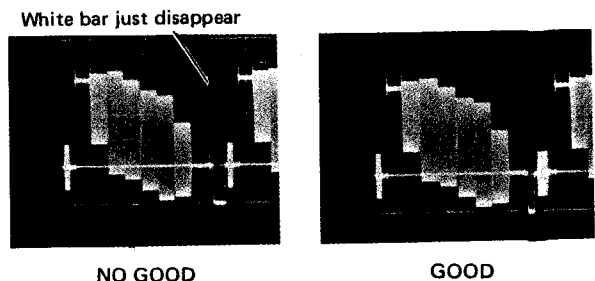


Fig. 5-3-1

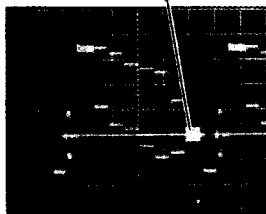
Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(b) Carrier balance and white balance adjustment

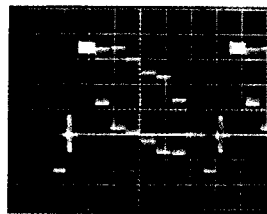
Test point : VIDEO OUT
 Adjusts : VR2 Process VIC6 board (V CARRIER BALANCE)
 VR3 Process VIC6 board (U CARRIER BALANCE)
 VR10 Process board (V WHITE BALANCE)
 VR11 Process board (U WHITE BALANCE)
 Observe : Waveform monitor

- o Observe the waveform monitor or connect the oscilloscope to the terminated VIDEO OUT signal and trigger the oscilloscope at H rate (Use TP4 (HD), Deflection board.).
- o Adjust VR2 (V CARRIER BALANCE) and VR3 (U CARRIER BALANCE) alternately so that the carrier on the black level of video signal becomes minimum. (Fig. 5-3-2)

Minimize the carrier



NO GOOD

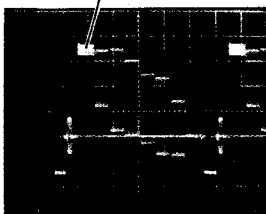


GOOD

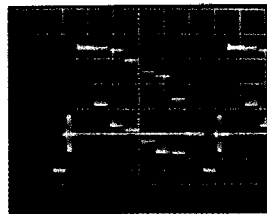
Fig. 5-3-2

- o Adjust VR10 (V WHITE BALANCE) and VR11 (U WHITE BALANCE) alternately so that the carrier on the white level of video signal becomes minimum. (Fig. 5-3-3)

Minimize the carrier



NO GOOD



GOOD

Fig. 5-3-3

- o Repeat adjusting VR2, VR3, VR10 and VR11 so that the carrier on the black and white level of video signal is minimum.

(c) Bar pedestal and Y gain adjustment

Test point : VIDEO OUT
 Adjusts : VR1 Process VIC7 board (BAR PEDESTAL)
 VR4 Process VIC7 board (Y GAIN)

- o Observe the waveform monitor, or connect the oscilloscope to the terminated VIDEO OUT signal and trigger the oscilloscope at H rate (Use TP4 (HD), Deflection board.).
- o Adjust VR1 (BAR PEDESTAL) so that the pedestal level of color bar signal is 0V. (Fig. 5-3-4)
- o Adjust VR4 (Y GAIN) so that the Y signal level of color bar signal is 0.7V. (Fig. 5-3-4)

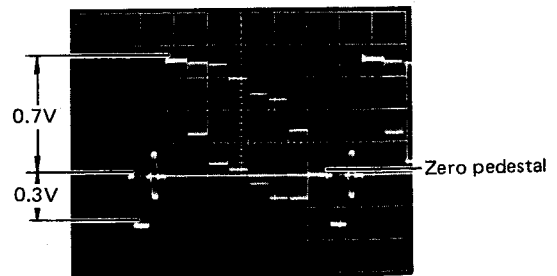


Fig. 5-3-4

(d) Chroma and Burst adjustment

Test point : VIDEO OUT
 Adjusts : VR8 Process board (BURST GAIN)
 VR9 Process board (BURST PHASE)
 VR1 (SC QUAD) Process VIC6 board
 VR4 (V GAIN) Process VIC6 board
 VR3 Process VIC7 board (CHROMA GAIN)
 Observe : Vectorscope

- o Observe the vectorscope.
- o Set the gain switch of the vectorscope to 75%.
- o Turn the gain control of vectorscope to increase the burst vector for better viewing.
- o Turn the phase control of vectorscope so that the burst vector for even field aligns with the U axis of the vectorscope. (Fig. 5-3-5)

Align the burst vector for even field with the U axis

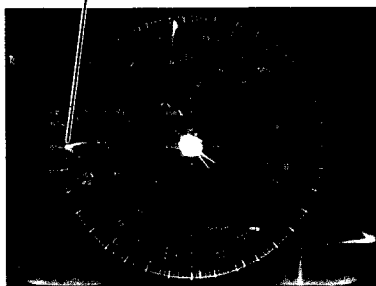


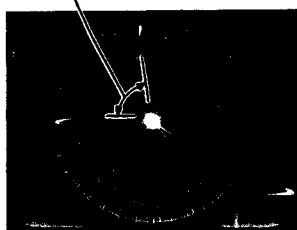
Fig. 5-3-5



Fig. 5-3-8

- o Adjust VR9 (BURST PHASE) so that the phase difference between the burst vectors for odd and even fields is 90° . (Fig. 5-3-6)

It should be 90°



NO GOOD



GOOD

Fig. 5-3-6

- o Set the gain control of vectorscope to the calibration position.
- o Turn the phase control of vectorscope so that the burst vectors positions on the burst axes on the vectorscope. (Fig. 5-3-7)

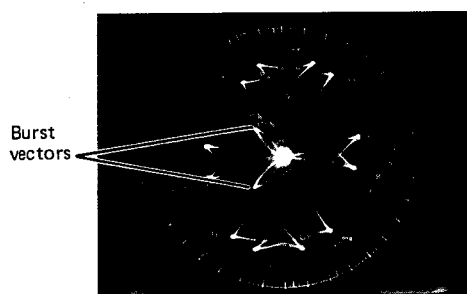
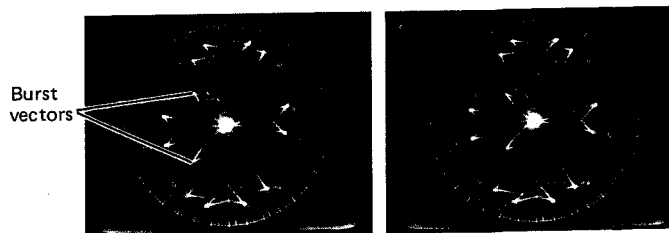


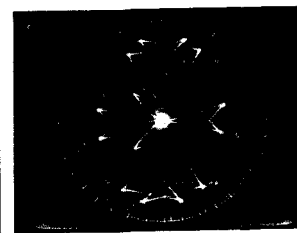
Fig. 5-3-7

- o Adjust VR1 (SC QUAD) and VR4 (V GAIN) on the Process VIC6 board and VR3 (CHROMA GAIN) on the Process VIC7 board so that the all vectors fall into their respective boxes on the vectorscope. (Fig. 5-3-8)

- o Repeat adjusting above steps until all vectors fall into their respective boxes on the vectorscope.
- o Adjust VR8 (BURST GAIN) on the Process board repeatedly so that the burst vector aligns on the burst axis, its amplitude is at 75% position and other vectors fall into their respective boxes on the vectorscope. (Fig. 5-3-9)



NO GOOD



GOOD

Fig. 5-3-9

5-4 Deflection Adjustment

- o Set the SW1 (COLOR BAR/CAMERA SELECTION SWITCH) to the CAMERA position and set the Iris Selection/Manual Control Knob to the AUTO position.

(a) Target voltage adjustment

Test points :	TP1	Deflection board
	(G TARGET)	
	TP2	Deflection board
	(B TARGET)	
	TP3	Deflection board
	(R TARGET)	
	TPG	Deflection board
	(GROUND)	
Adjusts :	VR23	Deflection board
	(G TARGET)	
	VR24	Deflection board
	(B TARGET)	
	VR25	Deflection board
	(R TARGET)	

■ G target voltage adjustment

- o Connect the digital voltmeter (DVM) probe between TP1 (G TARGET) and TPG (GROUND).
- o Adjust VR23 (G TARGET) so that the voltage at TP1 (G TARGET) is equal to $E_{sj} + AV$. (See Note.)

- Note :**
1. The target voltage of pick-up tube should be adjusted while referring to Table 5-4-1.
 2. The value of optimum target voltage E_{sj} is stamped on the pick-up tube neck.

Room Temperature	Target Voltage
Between -10°C and -5°C	$1.48 \times E_{sj} \text{ V}$
Between -5°C and 0°C	$1.38 \times E_{sj} \text{ V}$
Between 0°C and 5°C	$1.29 \times E_{sj} \text{ V}$
Between 5°C and 10°C	$1.22 \times E_{sj} \text{ V}$
Between 10°C and 15°C	$1.16 \times E_{sj} \text{ V}$
Between 15°C and 20°C	$1.08 \times E_{sj} \text{ V}$
Between 20°C and 30°C	$1.00 \times E_{sj} \text{ V}$
Between 30°C and 40°C	$0.92 \times E_{sj} \text{ V}$
Between 40°C and 50°C	$0.86 \times E_{sj} \text{ V}$
More than 50°C	$0.80 \times E_{sj} \text{ V}$

Table 5-4-1

■ R target voltage adjustment

- o Connect the DVM probe between TP3 (R TARGET) and TPG (GROUND).
- o Adjust VR25 (R TARGET) so that the voltage at TP3 (R TARGET) is equal to $E_{sj} + A \text{ V}$.

■ B target voltage adjustment

- o Connect the DVM probe between TP2 (B TARGET) and TPG (GROUND).
- o Adjust VR24 (B TARGET) so that the voltage at TP2 (B TARGET) is equal to $E_{sj} + A \text{ V}$.

(b) Focus adjustment

Test points :	TP1 (G IN)	Process board
	TP2 (R IN)	Process board
	TP3 (B IN)	Process board
Adjusts :	VR17 (R FOCUS)	Deflection board
	VR18 (B FOCUS)	Deflection board
	VR19 (G FOCUS)	Deflection board
	Backfocus adjusting screws	
Observe :	Monochrome underscanned video monitor	

- o Set the flangeback adjusting ring on the lens to the standard position (►●) after loosening the flangeback lock knob.
- o Set the SW1 (OVERSCAN SWITCH) on the deflection board to the UNDER position.
- o Set the SW3 (DETAIL ON/OFF SWITCH) on the Process board to OFF position.

■ G focus adjustment

- o Set the SW2 (-G ON/OFF SWITCH) on the Process board to OFF position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to G position.
- o Loosen the G coil lock screw (G LOCK) slightly. (Fig. 5-4-1)

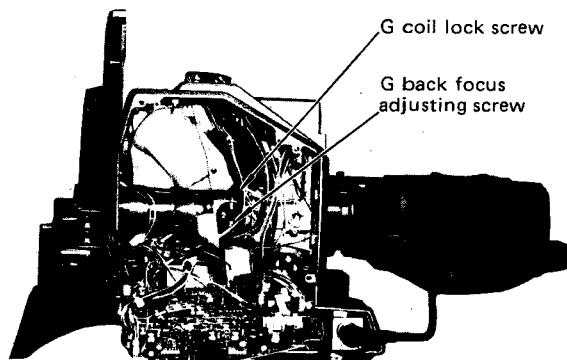


Fig. 5-4-1

- o Set the lens iris to fully open in order to have minimum depth of focus. If the picture on the monochrome underscanned monitor is saturated, set the filter wheel on the side of camera to the position 2.
- o Aim the camera at the resolution chart or in mega chart further than 2m from the camera.
- o Zoom in (close up) and adjust the lens focus while observing the monochrome underscanned video monitor.
- o Zoom out (wide angle) and adjust the focus by turning the G backfocus adjusting screw (G BACK-FOCUS). (Fig. 5-4-1)
- o Zoom in again and adjust the lens focus. (Adjust VR19 (G FOCUS) on the Deflection board if the electrical focus is excessively out of focus.)
- o Zoom out again and adjust the focus by turning the G backfocus adjusting screw.
- o Repeat this procedure until the focus tracks throughout the zoom range.
- o Aim the camera at the resolution or in mega chart so that the chart will fully occupies the screen of monitor.
- o Adjust VR19 (G FOCUS) to obtain best focus at the center of picture. When the in mega chart is used for the focus adjustment, the modulation depth at the center of in mega signal becomes maximum at the best focus. (Fig. 5-4-2)

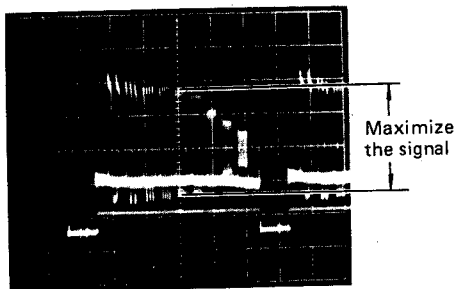


Fig. 5-4-2

- o Tighten the G coil lock screw (G LOCK) and make sure that the focus remains properly adjusted.

■ R focus adjustment

- o Set the filter wheel on the side of camera to the position 2 and the lens iris to fully open in order to have minimum depth of focus.
- o Aim the camera at the resolution chart or in mega chart.
- o Zoom in (close up) and adjust the lens focus while observing the monochrome underscanned video monitor.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to the R position for observing the red (R) signal.

- o Loosen the R coil lock screw (R LOCK) slightly. (Fig. 5-4-3)

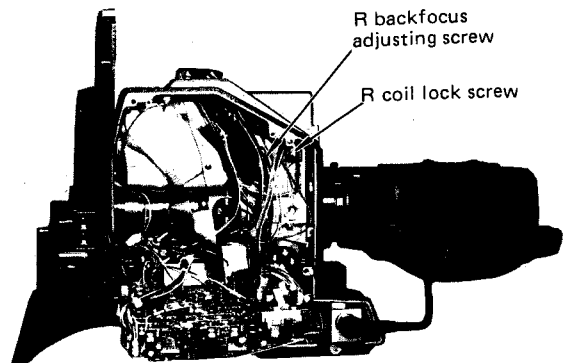


Fig. 5-4-3

- o Adjust the focus by turning the R backfocus adjusting screw (R BACKFOCUS). (Fig. 5-4-3)
- Note : Do not adjust the lens focus when adjusting the R backfocus.
- o Adjust VR17 (R FOCUS) to obtain best focus at the center of picture. When the in mega chart is used for the focus adjustment, the modulation depth at the center of in mega signal becomes maximum at the best focus. (Fig. 5-4-2)
- o Repeat adjusting the R backfocus adjusting screw and VR17 (R FOCUS) to obtain best focus.
- o Tighten the R coil lock screw (R LOCK) and make sure that the focus remains properly adjusted.

■ B focus adjustment

- o Set the filter wheel on the side of camera to the position 2 and the lens iris to fully open in order to have minimum depth of focus.
- o Aim the camera at the resolution chart or in mega chart.
- o Zoom in (close up) and adjust the lens focus while observing the monochrome underscanned video monitor.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to the B position for observing the blue (B) signal.

- o Loosen the B coil lock screw (B LOCK) slightly. (Fig. 5-4-4)

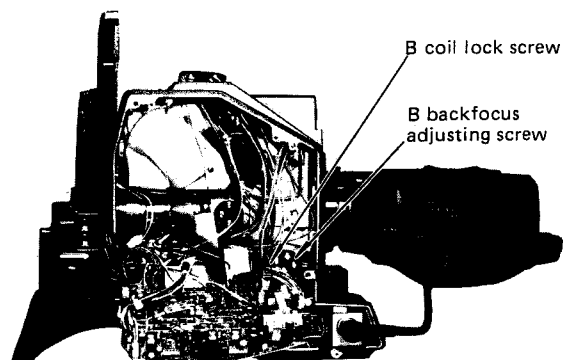


Fig. 5-4-4

- o Adjust the focus by turning the B backfocus adjusting screw (B BACKFOCUS). (Fig. 5-4-4)

Note : Do not adjust the lens focus when adjusting the B backfocus.

- o Adjust VR18 (B FOCUS) to obtain best focus at the center of picture. When the mega chart is used for the focus adjustment, the modulation depth at the center of in mega signal becomes maximum at the best focus. (Fig. 5-4-2)
- o Repeat adjusting the backfocus adjusting screw and VR18 (B FOCUS) to obtain best focus.
- o Tighten the B coil lock screw (B LOCK) and make sure that the focus remains properly adjusted.

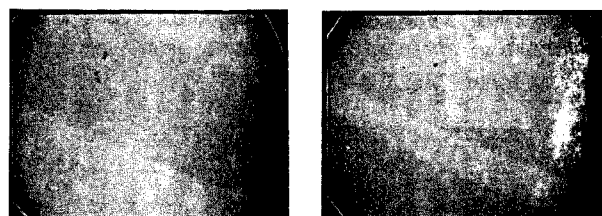
(c) Horizontal and vertical size adjustment

Test points :	TP1 (RESET)	Auto (A) board
	TP2 (RESET)	Auto (A) board
Adjusts :	VR12	Deflection board
	(TOTAL V-SIZE)	
	VR4 (R V-SIZE)	Deflection VIC board
	VR2 (B V-SIZE)	Deflection VIC board
	VR1 (G H-SIZE)	Deflection board
	VR13	Deflection board
	(R H-SIZE)	
	VR7 (B H-SIZE)	Deflection board
	VR3	Deflection board
	(G H-CENTERING)	
	VR1	Deflection VIC board
	(G V-CENTERING)	
	VR15	Deflection board
	(R H-CENTERING)	
	VR5	Deflection VIC board
	(R V-CENTERING)	
	VR9	Deflection board
	(B H-CENTERING)	
	VR3	Deflection VIC board
	(B V-CENTERING)	
Observe :	Monochrome underscanned video monitor	

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced

- o Short TP1 (RESET) and TP2 (RESET) on the Auto (A) board for a few seconds to initialize the micro-processor.
- o Set the SW1 (OVERSCAN SWITCH) on the Deflection board to the OVER position.
- o Set the SW2 (DETAIL ON/OFF SWITCH) on the Process board to OFF position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to G position in order to observe the green (G) picture on the monochrome underscanned video monitor.
- o Set the SW3 (DETAIL ON/OFF SWITCH) on the Process board to OFF position.
- o Adjust VR3 (G H-CENTERING) on the Deflection board and VR1 (G V-CENTERING) on the Deflection VIC board so that the target ring (edge) of G pick-up tube is observed equally at the four corners of monochrome underscanned monitor. (Fig. 5-4-5)

Note : If the target ring (edge) of G pick-up tube can not be observed, adjust VR1 (G H-SIZE) and VR12 (TOTAL V-SIZE) on the Deflection board.



NO GOOD

GOOD

Fig. 5-4-5

- o Aim the camera at the registration chart and adjust the zoom lens so that the a diagonal of chart is 95% of pick-up tube diameter. (Fig. 5-4-6)

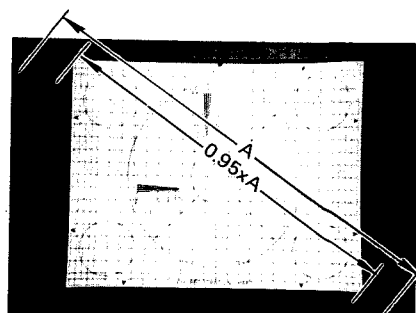


Fig. 5-4-6

- o Adjust VR1 (G H-SIZE) and VR12 so that the reference arrow heads in the registration chart line up with the edge of the raster on the monochrome underscanned video monitor. (Fig. 5-4-7)

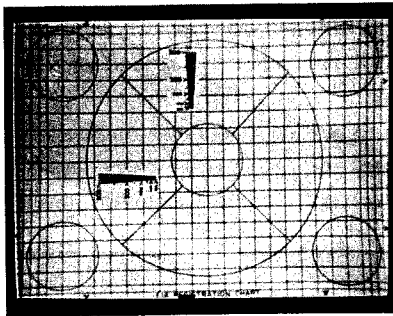
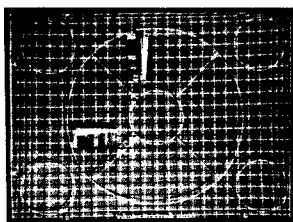
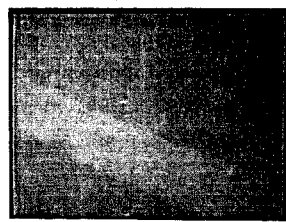


Fig. 5-4-7

- o Set the SW1 (REGISTRATION SWITCH) on the Process board to the R position and SW2 (DETAIL ON/OFF SWITCH) on the Process board to the -G position in order to observe the R-G picture.
- o Adjust VR15 (R H-CENTERING) and VR13 (R H-SIZE) on the Deflection board, and VR5 (R V-CENTERING) and VR4 (R V-SIZE) on the Deflection VIC board repeatedly so that the red (black line) pictures roughly coincide with each other over the entire raster. (Fig. 5-4-8)



NO GOOD



GOOD

Fig. 5-4-8

- o Set the SW1 (REGISTRATION SWITCH) on the Process board to the B position in order to observe the B-G picture.
- o Adjust VR9 (B H-CENTERING) and VR7 (B H-SIZE) on the Deflection board, and VR3 (B V-CENTERING) and VR2 (B V-SIZE) on the Deflection VIC board repeatedly so that the blue (black line) and green (white line) pictures roughly coincide with each other over the entire raster. (Fig. 5-4-8)

(d) Bias light adjustment

Test point :	TP3 (B IN)	Process board
Adjust :	VR35 (BIAS LIGHT)	Deflection board

- o Cap on the lens or set the filter wheel on the side of camera to the position 4.
- o Connect the oscilloscope to TP3 (B IN).
- o Trigger the oscilloscope at H.rate (Use TP9 (BL), Deflection board.).
- o Adjust VR35 (BIAS LIGHT) so that the bias light level is 8mV. (Fig. 5-4-9)

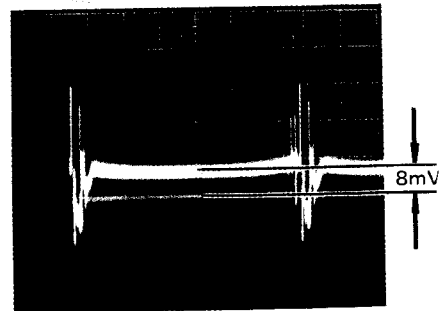


Fig. 5-4-9

(e) Beam current adjustment

Test points :	TP1 (G IN)	Process board
	TP2 (R IN)	Process board
	TP3 (B IN)	Process board
Adjusts :	VR20 (G BEAM)	Deflection board
	VR21 (B BEAM)	Deflection board
	VR22 (R BEAM)	Deflection board

- o Remove cap on the lens or set the filter wheel on the side of camera to the position 1.
- o Set the White Balance Selection Switch to P SET (PRESET) position.
- o Set the SW2 (FBC ON/OFF SWITCH) on the Deflection board to OFF position.
- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP1 (G IN).
- o Trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board.).
- o Set the Iris Selection/Manual Control Knob to the MANUAL position and adjust lens iris so that the video signal becomes 0.4V.

- o Turn VR20 (G BEAM) fully clockwise first. Then turn it back slowly and stop at the point where the white chip (top step) of gray scale waveform just appears completely. (Fig. 5-4-10)

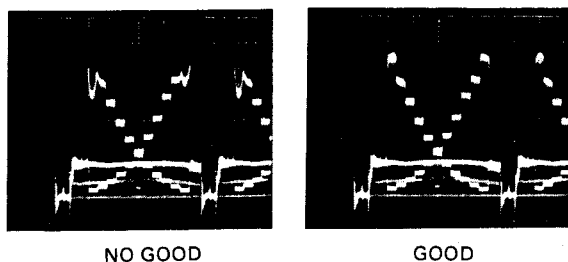


Fig. 5-4-10

- o Connect the oscilloscope to TP2 (R IN).
- o Turn VR22 (R BEAM) fully clockwise first. Then turn it back slowly and stop at the point where the white chip (top step) of gray scale waveform just appears completely as in the case of G beam adjustment. (Fig. 5-4-10)
- o Connect the oscilloscope to TP3 (B IN).
- o Turn VR21 (B BEAM) fully clockwise first. Then turn it back slowly and stop at the point where the white chip (top step) of gray scale waveform just appears completely as in the case of G and R beam adjustment. (Fig. 5-4-10)

(f) Beam alignment adjustment

- o Prepare a low-frequency sine wave oscillator hooking a $0.47\mu\text{F}/600\text{V}$ capacitor in series with its output.
- o Set the frequency in the range of 10 to 30Hz.
- o Adjust the signal level when necessary while watching the monitor.
- o Aim the camera at the registration chart.

■ G beam alignment adjustment

Test point :	Pin 1 of B14 (E4)	Deflection board
Adjust :	G Alignment	Coil assembly
Observe :	Monochrome underscanned video monitor	

- o Set the Iris Selection/Manual Control Knob to the AUTO position.
- o Feed the oscillator's output through the $0.47\mu\text{F}$ capacitor to pin 1 of B14 (E4) on the Deflection board. The registration chart on the monitor will move horizontally, vertically or diagonally.

- o Set SW1 (REGISTRATION SWITCH) on the Process board to G position and SW2 (-G ON/OFF SWITCH) on the Deflection board to OFF position.
- o Set the SW3 (DETAIL ON/OFF SWITCH) on the Process board to OFF position.
- o Adjust alignment magnets, so that the registration chart will not move in the vertical and horizontal direction.
- o Repeat adjusting alignment magnets so that the movement of registration chart, especially at the center, on the monitor is minimum. (Fig. 5-4-11)

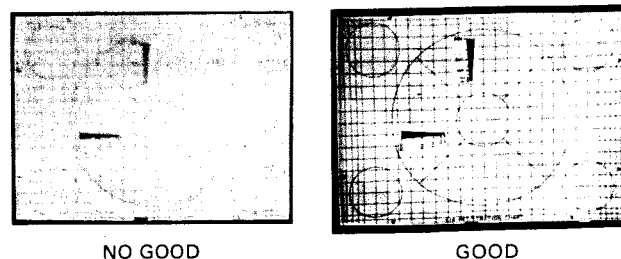


Fig. 5-4-11

- o When a low frequency oscillator is not available, turn VR19 (G FOCUS) for the G focus on the Deflection board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section. After adjustment, VR19 (G FOCUS) should be readjusted while referring to (b) Focus adjustment on page 2-13. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)

■ R beam alignment adjustment

Test point :	Pin 1 of B15 (E5)	Deflection board
Adjust :	R Alignment	Coil assembly
Observe :	Monochrome underscanned video monitor	

- o Feed the oscillator's output through $0.47\mu\text{F}$ capacitor to pin 1 of B15 (E5) on the Deflection board. The registration chart on the monitor will move horizontally, vertically or diagonally.
- o Set SW1 (REGISTRATION SWITCH) on the Process board to R position and SW2 (-G ON/OFF SWITCH) on the Deflection board to OFF position.
- o Adjust alignment magnets repeatedly so that the movement at the center of registration chart on the monitor is minimum as in the case of the G beam alignment adjustment.

- o When a low-frequency oscillator is not available, turn VR17 (R FOCUS) of the R focus on the Deflection board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section. After adjustment VR17 (R FOCUS) should be readjusted white referring to (b) Focus adjustment on page 2-14. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)

■ B beam alignment adjustment

Test point :	Pin 1 of B16 (E6)	Deflection board
Adjust :	B Alignment magnets	Coil assembly
Observe :	Monochrome underscanned video monitor	

- o Set SW1 (REGISTRATION SWITCH) on the Process board to B position and SW2 (-G ON/OFF SWITCH) on the Deflection board to OFF position.
- o Feed the oscillators output through 0.47 μ F capacitor to pin 1 of B16 (E6) on the Deflection board. The registration chart on the monitor will move horizontally, vertically or diagonally.
- o Adjust alignment magnets so that the movement at the center of registration chart on the monitor is minimum as in the case of the G and R beam alignment adjustment.
- o When a low-frequency oscillator is not available, turn VR18 (B FOCUS) for the B channel on the Deflection board back and forth quickly and adjust by the picture in the same manner as described in the preceding alignment adjustment section. After adjustment, VR18 (B FOCUS) should be readjusted white referring to (b) Focus adjustment on page 2-14. (This method is a rough adjustment. It is preferable to use a low-frequency oscillator method.)

(g) Centering adjustment

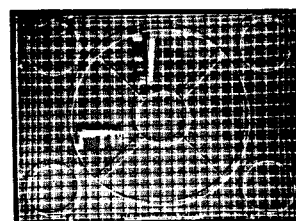
Adjusts :	VR3	Deflection board
	(G H-CENTERING)	
	VR1	Deflection VIC board
	(G V-CENTERING)	
	VR15	Deflection board
	(R H-CENTERING)	
	VR5	Deflection VIC board
	(R V-CENTERING)	
	VR9	Deflection board
	(B H-CENTERING)	
	VR3	Deflection VIC board
	(B V-CENTERING)	
Observe :	Monochrome underscanned video monitor	

- o Aim the camera at the registration chart.
- o Set the SW1 (OVERSCAN SWITCH) on the Deflection board to the OVER position.
- o Set the SW2 (-G ON/OFF SWITCH) on the Process board to OFF position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to G position.
- o Adjust VR3 (G H-CENTERING) on the Deflection board and VR1 (G V-CENTERING) on the Deflection VIC board so that the target ring (edge) of G pick-up tube is equally observed at the four corners of monochrome underscanned video monitor. (Fig. 5-4-12)

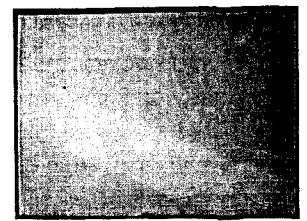


Fig. 5-4-12

- o Reset the SW1 (OVERSCAN SWITCH) on the Deflection board to the UNDER position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to the R position and SW2 (-G ON/OFF SWITCH) on the Process board to -G position in order to observe the R-G picture.
- o Adjust VR15 (R H-CENTERING) on the Deflection board and VR5 (R V-CENTERING) on the Deflection VIC board so that the red (black line) and green (white line) pictures roughly coincide with each other over the entire raster. (Fig. 5-4-13)



NO GOOD



GOOD

Fig. 5-4-13

- o Set the SW1 (REGISTRATION SWITCH) on the Process board to B position in order to observe the B-G picture.
- o Adjust VR9 (B H-CENTERING) on the Deflection board and VR3 (B V-CENTERING) on the Deflection VIC board so that the blue (black line) and green (white line) pictures roughly coincide with each other over the entire raster.

(h) G deflection coil rotation adjustment

Adjust :	G coil rotation screw
Observe :	Monochrome underscanned video monitor

- o Connect the VIDEO OUTPUT connector on the left side of camera to the VIDEO INPUT of monochrome underscanned video monitor loop through the GEN-LOCK INPUT of crosshatch generator and connect the VIDEO OUTPUT of crosshatch generator to the VIDEO INPUT of monochrome underscanned video monitor. (Fig. 5-4-14)

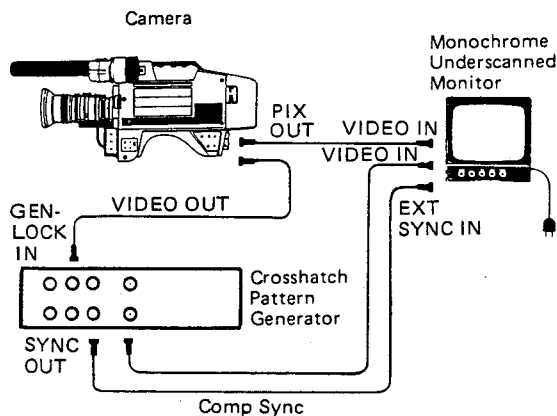


Fig. 5-4-14

- o Make sure that the camera is level with the chart.
- o Set the SW2 (-G ON/OFF SWITCH) on the Process board to OFF position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to G position.
- o Confirm that the horizontal line of crosshatch pattern is parallel with balls on the linearity chart.
- o If not, loosen the G coil lock screw (G LOCK) slightly and turn the G coil rotation screw (G ROTATION) slowly and carefully (Fig. 5-4-15) so that the balls in horizontal direction on the linearity chart is parallel with the horizontal line of crosshatch pattern. (Fig. 5-4-16)

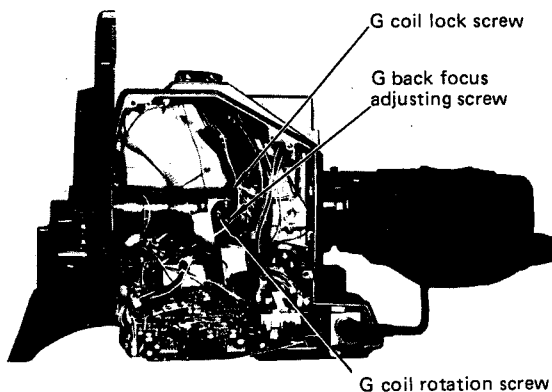


Fig. 5-4-15

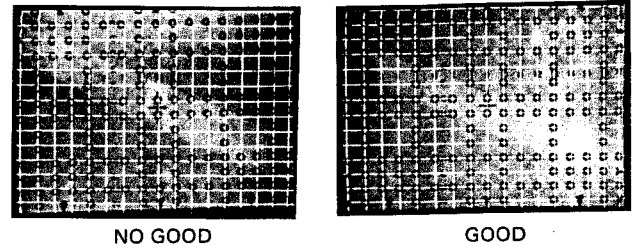


Fig. 5-4-16

(i) Linearity adjustment

Adjust :	VR2 (G H-LIN1)	Deflection board
	L2 (G H-LIN2)	Deflection board
	VR6 (G V-LIN)	Deflection board
Observe :	Monochrome underscanned video monitor	

- o Keep the VIDEO OUT connector on the left side of camera to the VIDEO INPUT of monochrome underscanned video monitor loop through the GEN-LOCK INPUT of crosshatch generator and VIDEO OUTPUT of crosshatch generator to the VIDEO INPUT of monochrome underscanned video monitor.
- o Keep the SW2 (-G ON/OFF SWITCH) on the Process board to OFF position and the SW1 (REGISTRATION SWITCH) on the Process board to G position.
- o Aim the camera at the linearity chart.
- o Line up the reference allow heads with edges of the raster on the monochrome underscanned video monitor. (Fig. 5-4-17)

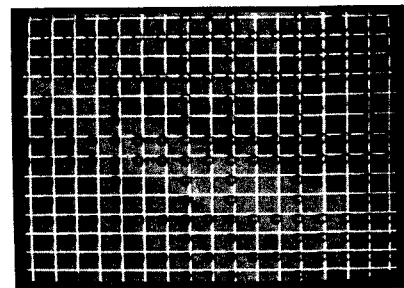


Fig. 5-4-17

- o Confirm that the center of linearity chart is aligned with the center of crosshatch pattern. If needed, adjust vertical and horizontal position of crosshatch pattern on the generator. (Fig. 5-4-18)

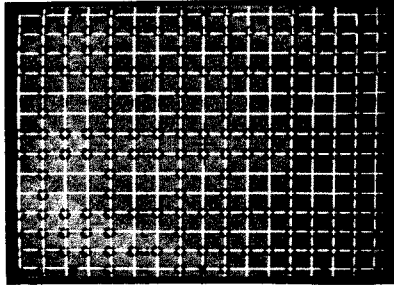


Fig. 5-4-18

- o Adjust VR2 (G H-LIN1), L2 (G H-LIN2) and VR6 (G V-LIN) so that each center (white) portion of ball on the linearity chart aligns with each cross point of the crosshatch pattern. (Fig. 5-4-19)

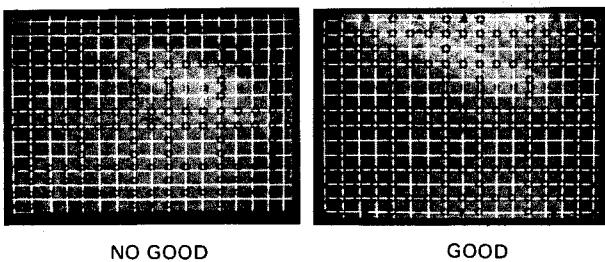


Fig. 5-4-19

- o Disconnect the VIDEO OUTPUT connector of crosshatch generator from the monochrome underscanned video monitor and the VIDEO OUTPUT on the left side of camera from the crosshatch generator.

(j) Red registration adjustment

Adjusts :	R coil rotation screw
VR13	Deflection board
(R H-SIZE)	
VR14	Deflection board
(R H-LIN1)	
L8 (R H-LIN2)	Deflection board
VR4	Deflection VIC board
(R V-SIZE)	
VR4	Deflection board
(R V-LIN)	
VR11	Deflection board
(R SKEW)	
VR15	Deflection board
(R H-CENTERING)	
VR5	Deflection board
(R V-CENTERING)	
Observe :	Monochrome underscanned video monitor

- o Connect the VIDEO OUTPUT connector on the left side of camera to the monochrome underscanned video monitor through the waveform monitor, vectorscope and color video monitor.
- o Set the SW2 (-G ON/OFF SWITCH) on the Process board to G position.
- o Set the SW1 (REGISTRATION SWITCH) on the Process board to R position.
- o Aim the camera at the registration chart.

■ R deflection coil rotation adjustment

- o Loosen the R coil lock screw (R LOCK) slightly and turn the R coil rotation screw (R ROTATION) slowly and carefully (Fig. 5-4-20) so that the R horizontal (black) lines of registration chart are parallel with the G horizontal (white) lines. (Fig. 5-4-21). The parallel can be confirmed by turning VR5 (R V-CENTERING) on the Deflection VIC board.

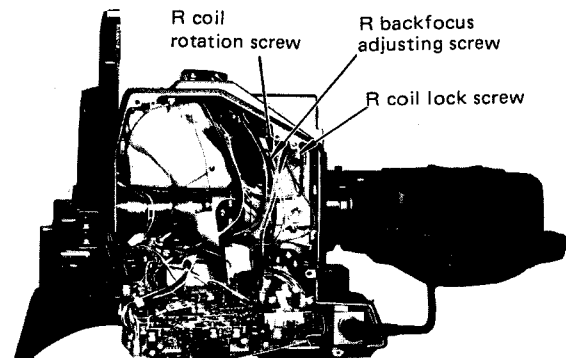


Fig. 5-4-20

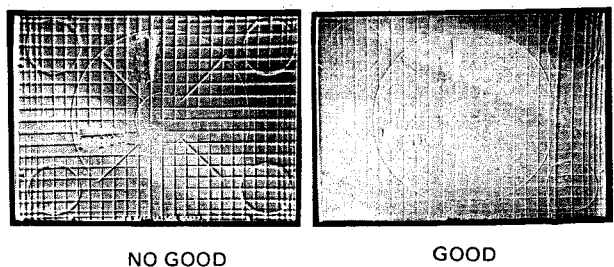


Fig. 5-4-21

- o Confirm that the R backfocus remains properly adjusted. If not, readjust the R backfocus screw while referring to R focus adjustment on page 2-14.
- o Tighten the R coil lock screw (R LOCK) after confirming the R deflection coil rotation and R back-focus.

R skew adjustment

- Adjust VR11 (R SKEW) so that the R vertical (black) lines of registration chart are parallel with the G vertical (white) lines. (Fig. 5-4-22) The parallel can be confirmed by turning VR15 (R H-CENTERING).

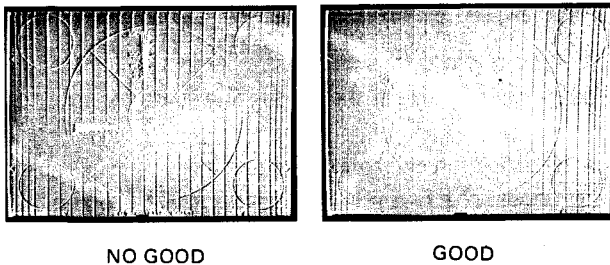


Fig. 5-4-22

R horizontal registration adjustment

- Adjust VR5 (R V-CENTERING) on the Deflection VIC board so that the center horizontal lines of the registration chart for the R and G pictures coincide.
 - Adjust VR15 (R H-CENTERING), VR13 (R H-SIZE), VR14 (R H-LIN1) and L8 (R H-LIN2) repeatedly so that the R vertical lines in the center portion of registration chart coincide with the G vertical lines. (Fig. 5-4-23).
- L8 (R H-LIN2) is mainly used for adjusting the overall horizontal linearity and VR14 (R H-LIN1) for the left side horizontal linearity.

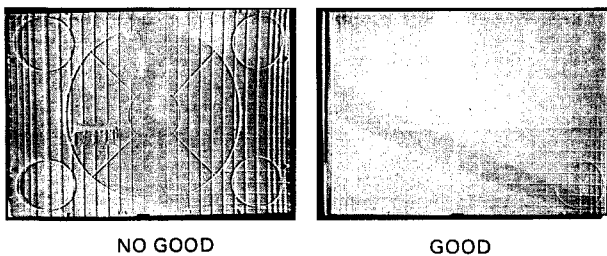


Fig. 5-4-23

Note : When the R and G lines coincide, the contrast of line becomes minimum.

R vertical registration adjustment

- Adjust VR5 (R V-CENTERING) and VR4 (R V-LIN) on the Deflection board, and VR4 (R V-SIZE) on the Deflection VIC board repeatedly so that the R horizontal lines of registration chart coincide with the G horizontal lines. (Fig. 5-4-24)

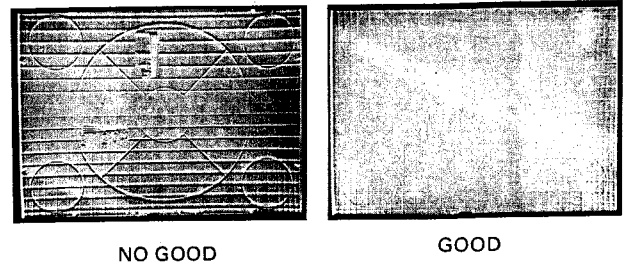


Fig. 5-4-24

R registration fine-adjustment

- Check that the R and G lines of the registration chart coincide over the entire raster on the monochrome underscanned video monitor.
- If needed, fine-adjust VR15 (R H-CENTERING), VR11 (R SKEW), VR13 (R H-SIZE), VR14 (R H-LIN1), L8 (R H-LIN2) and VR4 (R V-LIN) on the Deflection board, and VR4 (R V-SIZE) and VR5 (R V-CENTERING) on the Deflection VIC board carefully so that the R and G lines coincide.

(k) Blue registration adjustment

Adjusts :	B coil rotation screw
VR7	Deflection board
(B H-SIZE)	
VR8	Deflection board
(B H-LIN1)	
L5 (B H-LIN2)	Deflection board
VR2	Deflection VIC board
(B V-SIZE)	
VR5 (B V-LIN)	Deflection board
VR10 (B SKEW)	Deflection board
VR9	Deflection board
(B H-CENTERING)	
VR3	Deflection VIC board
(B V-CENTERING)	
Observe :	Monochrome underscanned video monitor

- Set the SW2 (-G ON/OFF SWITCH) on the Process board to G position.
- Set the SW1 (REGISTRATION SWITCH) on the Process board to B position.
- Aim the camera at the registration chart.
- Adjust the blue registration as in the case of red registration adjustment.

■ **B deflection coil rotation adjustment**

- o Loosen the B coil lock screw (B LOCK) slightly and turn the B coil rotation screw (B ROTATION) slowly and carefully (Fig. 5-4-25) so that the B horizontal (Black) lines of registration chart are parallel with the G horizontal (white) lines. (Fig. 5-4-21) The parallel can be confirmed by turning VR3 (B V-CENTERING) on the Deflection VIC board.

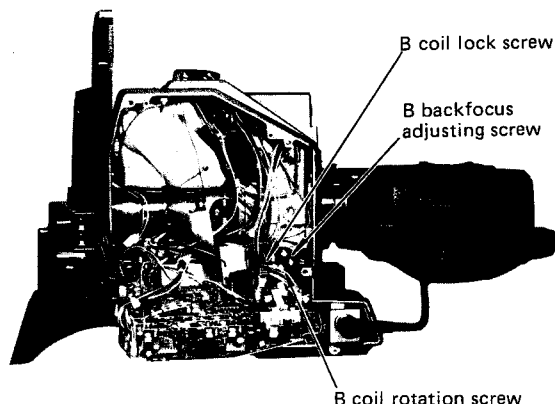


Fig. 5-4-21

- o Confirm that the B backfocus remains properly adjusted. If not, readjust the B backfocus screw while referring to B focus adjustment on page 2-14.
- o Tighten the B coil lock screw (B LOCK) after confirming the B deflection coil rotation and B back-focus.

■ **B skew adjustment**

- o Adjust VR10 (B SKEW) so that the B vertical (black) lines of registration chart are parallel with the G vertical (white) lines. (Fig. 5-4-22) The parallel can be confirmed by turning VR9 (B H-CENTERING).

■ **B horizontal registration adjustment**

- o Adjust VR3 (B V-CENTERING) on the Deflection VIC board so that the center horizontal lines of the registration chart for the B and G pictures coincide.
- o Adjust VR9 (B H-CENTERING), VR7 (B H-SIZE), VR8 (B H-LIN1) and L5 (B H-LIN2) repeatedly so that the B vertical lines in the center portion of registration chart coincide with the G vertical lines. (Fig. 5-4-23)

L5 (B H-LIN2) is mainly used for adjusting the overall horizontal linearity and VR8 (B H-LIN1) for the left side horizontal linearity.

Note : When the B and G lines coincide, the contrast of line is minimum.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

■ **B vertical registration adjustment**

- o Adjust VR3 (B V-CENTERING) and VR5 (B V-LIN) on the Deflection board and VR2 (B V-SIZE) repeatedly so that the B horizontal lines of registration chart coincide with the G horizontal lines. (Fig. 5-4-24)

■ **B registration fine-adjustment**

- o Check that the B and G lines of the registration chart coincide over the entire raster on the monochrome underscanned video monitor. If needed, fine-adjust VR9 (B H-CENTERING), VR10 (B SKEW), VR7 (B H-SIZE), VR8 (B H-LIN1), L5 (B H-LIN2) and VR5 (B V-LIN) on the Deflection board, and VR3 (B V-CENTERING) and VR2 (B V-SIZE) on the Deflection VIC board carefully so that the B and G lines coincide.

5-5 Preamplifier Adjustment

- o Connect the oscilloscope to TP1 (G IN) on the Process board and set the Iris Selection/Manual Control Knob to the MANUAL position. Adjust lens iris so that the video signal becomes 0.2Vp-p.
- o Keep setting the lens iris on the lens to above iris level.

(a) **Frequency response adjustment**

Test points :	TP1 (G IN)	Process board
	TP2 (R IN)	Process board
	TP3 (B IN)	Process board
Adjusts :	CT1	Preamplifier board
	(FREQUENCY RESPONSE)	

- o Aim the camera at the in-megacycle chart.
- o Connect the oscilloscope to TP1 (G IN) for the green signal.
- o Trigger the oscilloscope at H rate. (Use TP4 (HD), Deflection board.)
- o Expand the 0.5MHz - cycle portion on the oscilloscope. (Fig. 5-5-1)

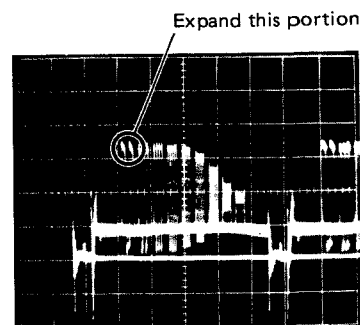


Fig. 5-5-1

- o Adjust CT1 (FREQUENCY RESPONSE) on the Preamplifier board for the G channel (Fig. 5-5-2) to make the signal waveform as flat as possible. (Fig. 5-5-3)

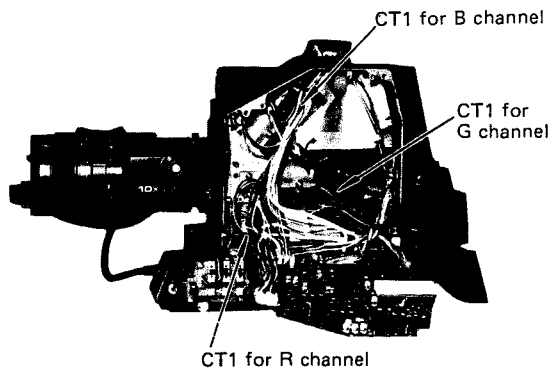


Fig. 5-5-2

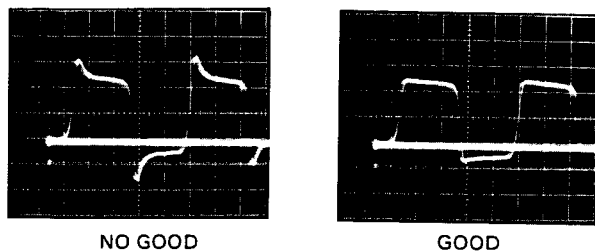


Fig. 5-5-3

- o Connect the oscilloscope to TP2 (R IN) for the red signal.
- o Adjust CT1 (FREQUENCY RESPONSE) on the Preamplifier board for the R channel (Fig. 5-5-2) to make the signal waveform as flat as possible as in the case of G frequency response adjustment. (Fig. 5-5-3)
- o Connect the oscilloscope to TP3 (B IN) for the blue signal.
- o Adjust CT1 (FREQUENCY RESPONSE) on the Preamplifier board for the B channel (Fig. 5-5-2) to make the signal waveform as flat as possible as in the case of G and R frequency response adjustment. (Fig. 5-5-3)

5-6 Process Adjustment

- o Connect the oscilloscope to TP1 (G IN) on the Process board and set the Iris Selection/Manual Control Knob to the MANUAL position. Adjust lens iris so that the video signal becomes 0.2V.
- o Keep setting the lens iris on the lens to above iris level.
- o Set the SW2 (-G ON/OFF SWITCH) on the Process board to COMP position.

(a) Input gain adjustment

Test points :	TP1 (G)	Process VIC1 board
	TP2 (R)	Process VIC2 board
	TP3 (B)	Process VIC3 board
Adjusts :	VR1	Process VIC1 board
	(G INPUT GAIN)	
	VR1	Process VIC2 board
	(R INPUT GAIN)	
	VR1	Process VIC3 board
	(B INPUT GAIN)	

- o Aim the camera at the logarithmic gray scale chart.
- o Set the High Gain Selection Switch to the 0 dB position.
- o Connect the oscilloscope to TP1 (G) on the Process VIC1 board and trigger the oscilloscope at H rate (Use TP9, Deflection board).
- o Adjust VR1 (G INPUT GAIN) on the Process VIC1 board for 1.6V. (Fig. 5-6-1)

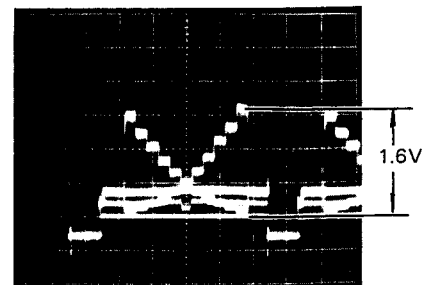


Fig. 5-6-1

- o Connect the oscilloscope to TP2 (R) on the Process VIC2 board and adjust VR1 (R INPUT GAIN) on the Process VIC2 board for 1.6V.
- o Connect the oscilloscope to TP3 (B) on the Process VIC3 board and adjust VR1 (B INPUT GAIN) on the Process VIC3 board for 1.6V.

(b) Dark shading adjustment

Test points :	TP9 (G OUT)	Process board
	TP10 (R OUT)	Process board
	TP11 (B OUT)	Process board
Adjusts :	VR1	Process VIC4 board
	(G V-SAWTOOTH)	
	VR2	Process VIC4 board
	(G V-PARABOLA)	
	VR3	Process VIC4 board
	(G H-SAWTOOTH)	
	VR4	Process VIC4 board
	(G H-PARABOLA)	
	VR5	Process VIC4 board
	(R V-SAWTOOTH)	
	VR6	Process VIC4 board
	(R V-PARABOLA)	
	VR7	Process VIC4 board
	(R H-SAWTOOTH)	
	VR8	Process VIC4 board
	(R H-PARABOLA)	
	VR9	Process VIC4 board
	(B V-SAWTOOTH)	
	VR10	Process VIC4 board
	(B V-PARABOLA)	
	VR11	Process VIC4 board
	(B H-SAWTOOTH)	
	VR12	Process VIC4 board
	(B H-PARABOLA)	

- o Cap on the lens or set the filter wheel to the position 4. Set the High Gain Selection Switch to the +12 dB position.

■ **G dark shading adjustment**

- o Connect the oscilloscope to TP9 (G OUT) and trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board.).
- o While observing the waveform, adjust VR3 (G H-SAWTOOTH) and VR4 (G H-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible. (Fig. 5-6-2)

Note : When the pedestal level is zero (black level and the blanking level is the same) and the dark signal waveform can not be observed, turn VR2 (G PEDESTAL) on Process VIC1 board counterclockwise to observe the dark signal. It will be adjusted later.

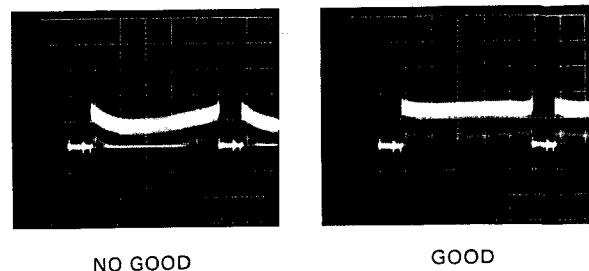


Fig. 5-6-2

- o After above adjustment, trigger the oscilloscope at V rate (Use TP8 (Vs), Deflection board.).
- o Adjust VR1 (G V-SAWTOOTH) and VR2 (G V-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible. (Fig. 5-6-3)

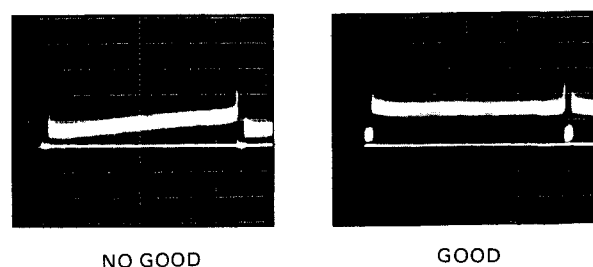


Fig. 5-6-3

- o Adjust R and B dark shading in the same manner.

■ **R dark shading adjustment**

- o Connect the oscilloscope to TP10 (R OUT) and trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board.).
- o Adjust VR7 (R H-SAWTOOTH) and VR8 (R H-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible as in the case of G dark shading adjustment. (Fig. 5-6-2)

Note : When the pedestal level is zero (black level and the blanking level is the same) and the dark signal waveform can not be observed, turn VR2 (R PEDESTAL) on Process VIC2 board counterclockwise to observe the dark signal. It will be adjusted later.

- o Trigger the oscilloscope at V rate (Use TP8 (Vs), Deflection board.).
- o Adjust VR5 (R V-SAWTOOTH), VR6 (R V-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible. (Fig. 5-6-3)

■ **B dark shading adjustment**

- o Connect the oscilloscope to TP11 (B OUT) and trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board.).
- o Adjust VR11 (B H-SAWTOOTH) and VR12 (B H-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible as in the case of G dark shading adjustment. (Fig. 5-6-2)

Note : When the pedestal level is zero (black level and the blanking level is the same) and the dark signal waveform can not be observed, turn VR2 (B PEDESTAL) on Process VIC3 board counterclockwise to observe the dark signal. It will be adjusted later.

- o Trigger the oscilloscope at V rate (Use TP8 (Vs), Deflection board.).
- o Adjust VR9 (V B-SAWTOOTH) and VR10 (B V-PARABOLA) on the Process VIC4 board to make the dark waveform as flat as possible. (Fig. 5-6-3)

(c) **Blanking offset adjustment**

Test points :	TP1 (PRESET)	Auto (A) board
	TP2 (PRESET)	Auto (A) board
	TP9 (G OUT)	Process board
	TP10 (R OUT)	Process board
	TP11 (B OUT)	Process board
Adjusts :	VR13	Process VIC4 board (G BLANKING OFFSET)
	VR14	Process VIC4 board (B BLANKING OFFSET)
	VR15	Process VIC4 board (R BLANKING OFFSET)

- o Keep cap on the lens or set the filter wheel to the position 4.
- o Short TP1 (PRESET) and TP2 (PRESET) on the Auto (A) board for a few seconds to initialize the microprocessor.

■ **G blanking offset adjustment**

- o Connect the oscilloscope to TP9 (G OUT) and trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board.).
- o Set the High Gain Selection Switch on the side of the camera to 0 dB position and note the pedestal level at T9 (G OUT). (Fig. 5-6-4)

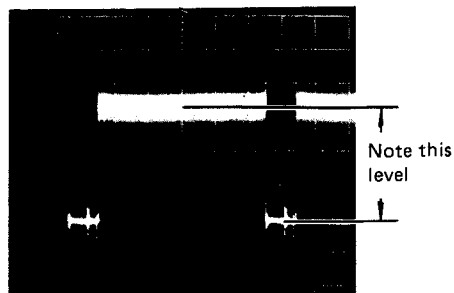


Fig. 5-6-4

- o Set the High Gain Selection Switch on the side of the camera to +12 dB position and adjust VR13 (G BLANKING OFFSET) on Process VIC4 board so that the pedestal level at TP9 (G OUT) is same as the noted level. (Fig. 5-6-5)

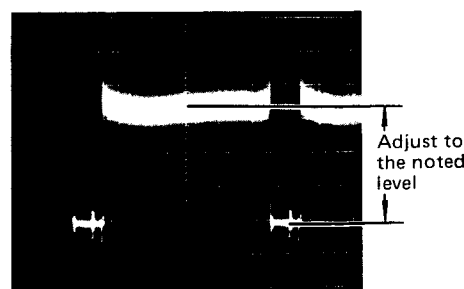


Fig. 5-6-5

- o Set the High Gain Selection Switch on the side of the camera to 0dB position and note the pedestal level again.
- o Set the High Gain Selection Switch to +12 dB position again and readjust VR13 (G BLANKING OFFSET) so that the pedestal level is same as the noted level.
- o Repeat this procedure until the pedestal level stays same at the 0 dB and +12 dB position. (Fig. 5-6-6)
- o Set the High Gain Selection Switch to 0 dB position.

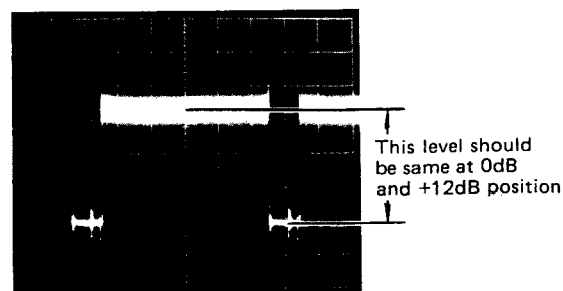


Fig. 5-6-6

- o Adjust R and B blanking offset in the same manner.

■ R blanking offset adjustment

- o Adjust VR15 (R BLANKING OFFSET) on Process VIC4 board as in the case of G blanking offset adjustment so that the pedestal level at TP10 (R OUT) on Process board stays same at the 0 dB and +12 dB position of High Gain Selection Switch as in case of G blanking offset adjustment.

■ B blanking offset adjustment

- o Adjust VR14 (B BLANKING OFFSET) on Process VIC 4 board as in case of G blanking offset adjustment so that the pedestal level at TP11 (B OUT) on Process board stays same at the 0 dB and +12 dB position of High Gain Selection Switch as in case of G and R blanking offset adjustment.

(d) V detail gain adjustment

Test point :	TP18 (V EDGE)	Process board
Adjust :	VR17	Process board
	(V GAIN)	

- o Remove cap on the lens or set the filter wheel to the position 1.
- o Set the Iris Selection/Manual Control Knob to the AUTO position.
- o Set the SW3 (DETAIL ON/OFF SWITCH) on the Process board to ON position.
- o Aim the camera at the window chart.
- o Connect the oscilloscope to TP18 (V EDGE).
- o Trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board).
- o Adjust VR17 (V GAIN) so that the left side of the V edge signal becomes 100mVp-p. (Fig. 5-6-7)

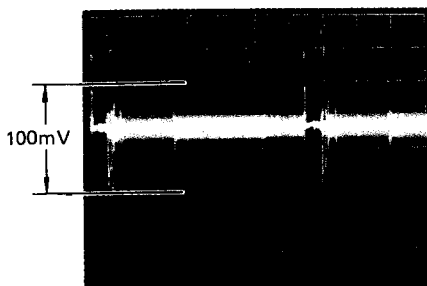


Fig. 5-6-7

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

(e) Level dependent and noise suppress adjustment

Test points : VIDEO OUT

TP20 Process board

(DETAIL OUT)

Adjusts : VR19 Process board

(NOISE SUPPRESS)

VR21 Process board

(LEVEL DEPENDENT)

- o Turn VR19 (NOISE SUPPRESS) and VR21 (LEVEL DEPENDENT) fully clockwise.
- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to TP20 (DETAIL OUT).
- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board).
- o Note the noise level of the detail signal as A mVp-p. (Fig. 5-6-8)

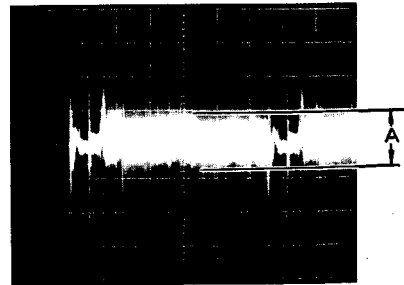


Fig. 5-6-8

- o Adjust VR19 (NOISE SUPPRESS) so that the noise level becomes $A \times 0.3$. (Fig. 5-6-9)

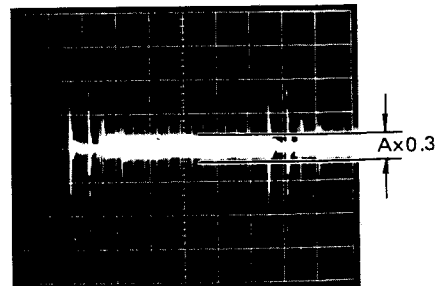


Fig. 5-6-9

- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)

- o Adjust VR21 (LEVEL DEPENDENT) so that the noise on the black chip (zero step) of the gray scale waveform is suppressed. (Fig. 5-6-10)

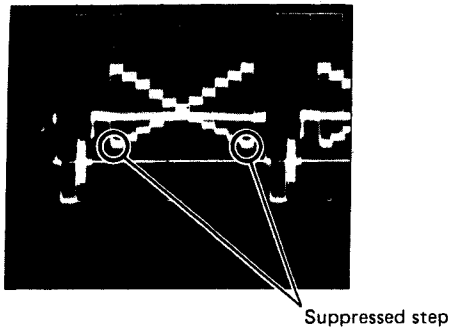


Fig. 5-6-10

(f) Vertical edge balance and vertical edge bias adjustment

Test points :	Pin 5 of VIC13	Process VIC13 board
	Pin 5 of VIC14	Process VIC14 board
	TP6 (G)	Process board
	TP16 (1H)	Process board
	TP18	Process board
	(V. EDGE)	
Adjusts :	VR12	Process board
	(1H CCD BIAS)	
	VR13	Process board
	(2H CCD BIAS)	
	VR14	Process board
	(1H CCD GAIN)	
	VR15	Process board
	(V. EDGE BALANCE)	

- o Unsolder three points holding the shield case cover on the Process board and remove the shield case cover.
- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to pin 5 of VIC13 on the Process VIC13 board.
- o Turn VR12 (1H CCD BIAS) fully counterclockwise.
- o Turn back VR12 (1H CCD BIAS) slowly and stop it at the point where the distortion of the H.BL signal becomes minimum. (Fig. 5-6-11)

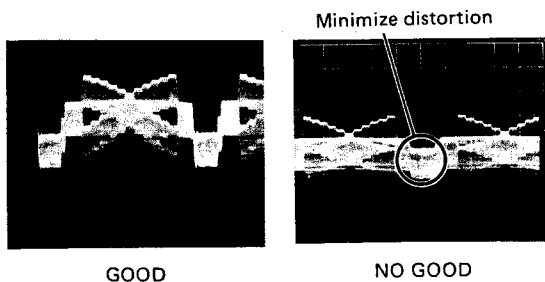


Fig. 5-6-11

- o Set the oscilloscope input coupling selector to DC position.
- o Note the DC level of H.BL portion as A.
- o Adjust VR12 (1H CCD BIAS) so that the H.BL DC level becomes $A+0.1V$. (Fig. 5-6-12)

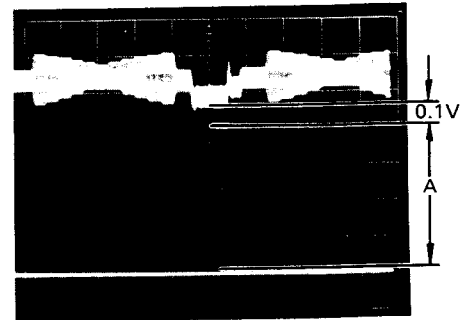


Fig. 5-6-12

- o Reset the oscilloscope input coupling selector to AC position.
- o Connect the oscilloscope to TP6 (G) and TP16 (1H).
- o Adjust VR14 (1H CCD GAIN) so that the signal level at TP6 (G) and TP16 (1H) becomes equal. (Fig. 5-6-13)

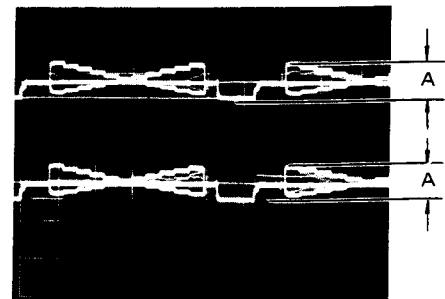


Fig. 5-6-13

- o Connect the oscilloscope to pin 5 of VIC14 on the Process VIC 14 board.
- o Turn VR13 (2H CCD BIAS) fully counterclockwise.
- o Turn VR13 (2H CCD BIAS) slowly and stop it at the point where the distortion of the H.BL signal becomes minimum. (Fig. 5-6-14)

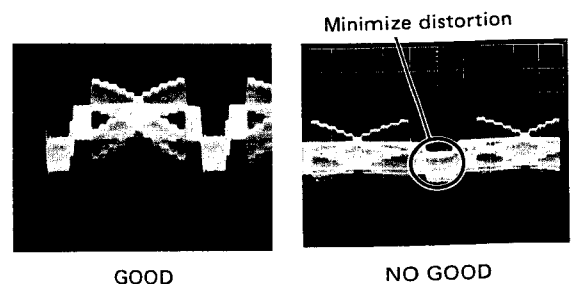


Fig. 5-6-14

- o Reset the oscilloscope input coupling selector to DC position.
- o Note the DC level of H.BL portion as B.
- o Adjust VR13 (2H CCD BIAS) so that the H.B. DC level becomes $B + 0.1V$. (Fig. 5-6-15)

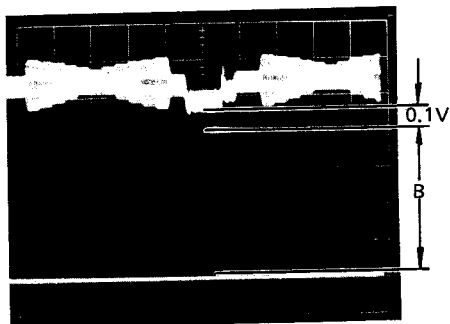
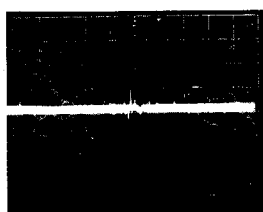
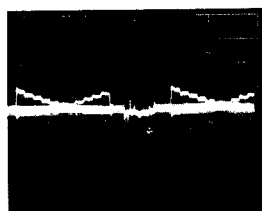


Fig. 5-6-15

- o Reset the oscilloscope coupling selector to AC position.
- o Connect the oscilloscope to TP18 (V. EDGE).
- o Adjust VR15 (V. EDGE BALANCE) to cancel the video signal. (Fig. 5-6-16)



GOOD



NO GOOD

Fig. 5-6-16

- o Replace the shield case cover and solder the three points.

(g) Detail gain adjustment

Test point :	VIDEO OUT	
Adjust :	VR18	Process board
	(H GAIN)	
	VR20	Process board
	(DETAIL GAIN)	

- o Set the Iris Selection/Manual Control Knob to the MANUAL position.
- o Aim the camera at the window chart so that the chart fully occupies the raster.
- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Trigger the oscilloscope at V rate. (Use TP8 (Vs), Deflection board.)

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- o Set the lens iris so that A becomes 0.5 V.
- o Adjust VR20 (DETAIL GAIN) so that the vertical detail (aperture) signal B becomes $(B+C)/2A \times 100 = 135 \pm 5\%$ from the black level of the window chart signal. (Fig. 5-6-17)

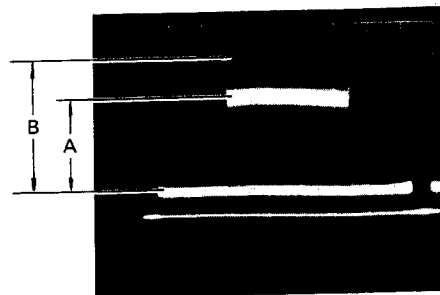


Fig. 5-6-17

- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)
- o Confirm that the horizontal detail (aperture) signal B and C is $(B+C)/2A \times 100 = 125 \pm 5\%$. If not, readjust VR18 (H GAIN). (Fig. 5-6-18)

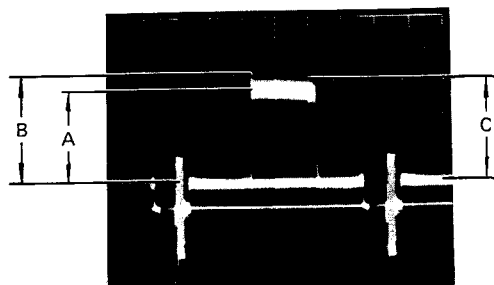


Fig. 5-6-18

(h) Pulse mix adjustment

Test point :	VIDEO OUT	
Adjust :	VR16	Process board
	(PULSE MIX)	

- o Cap on the lens or set the filter wheel to the position 4.
- o Observe the waveform monitor or connect the oscilloscope to terminated VIDEO OUT signal.
- o Set SW3 (DETAIL ON/OFF SWITCH) on the Process board to OFF position and note the pedestal level of video signal.

- o Set SW3 (DETAIL ON/OFF SWITCH) on the Process board to ON position and adjust VR16 (PULSE MIX) so that the pedestal level of video signal is the same as the noted level. (Fig. 5-6-19)

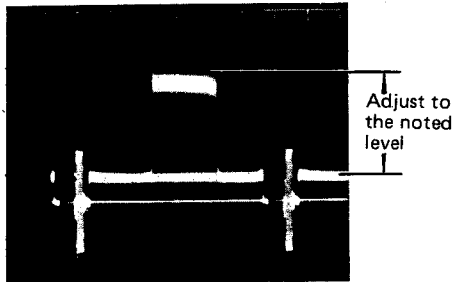


Fig. 5-6-19

- o Set SW3 (DETAIL ON/OFF SWITCH) on the Process board to OFF position and note the pedestal level again.
- o Set SW3 (DETAIL ON/OFF SWITCH) on the Process board to ON position and adjust VR16 (PULSE MIX) so that the pedestal level is the same as the noted level. (Fig. 5-6-20)
- o Repeat this procedure until the pedestal level stays the same by operating SW3 (DETAIL ON/OFF SWITCH) on the Process board ON and OFF.

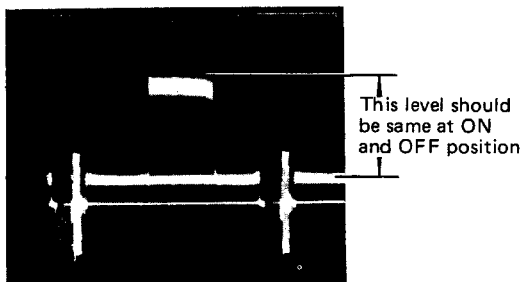


Fig. 5-6-20

- o Set SW3 (DETAIL ON/OFF SWITCH) on the Process board to ON position.

(i) Pedestal adjustment

Test points :	TP9 (G OUT)	Process board
	TP10 (R OUT)	Process board
	TP11 (B OUT)	Process board
Adjusts :	VR2	Process VIC1 board
	(G PEDESTAL)	
	VR2	Process VIC2 board
	(R PEDESTAL)	
	VR2	Process VIC3 board
	(B PEDESTAL)	

■ G pedestal adjustment

- o Cap on the lens or set the filter wheel to the position 4.
- o Connect the oscilloscope to TP9 (G OUT) and trigger the oscilloscope at H rate (Use TP9 (BL), Deflection board).
- o Turn VR2 (G PEDESTAL) on the Process VIC1 board counterclockwise to observe the signal as shown in Fig. 5-6-21. Turn back VR2 (G PEDESTAL) on the Process VIC1 board until the pedestal level is zero (The blanking level just touches to the noise.). (Fig. 5-6-22)

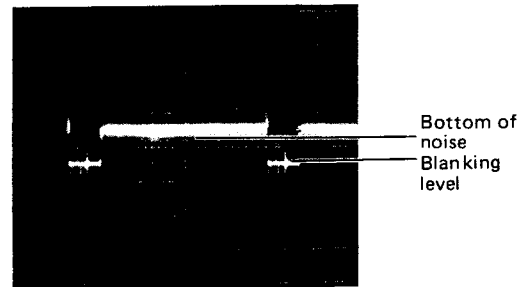


Fig. 5-6-21

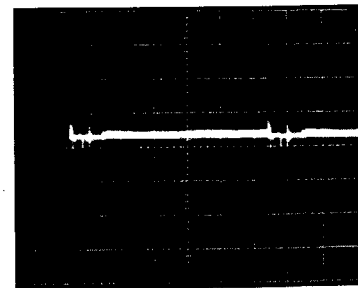


Fig. 5-6-22

Note: Confirm that the G pedestal level does not change by operating High Gain Selection Switch to 0dB and +12 dB position.

If change, readjust the VR13 (G BLANKING OFFSET) on the Process VIC4 board.

- o Adjust R pedestal and B pedestal in the same manner.

■ R pedestal adjustment

- o Connect the oscilloscope to TP10 (R OUT).
- o Adjust VR2 (R PEDESTAL) on the Process VIC2 board so that the pedestal level is zero as in case of G pedestal adjustment.

■ B pedestal adjustment

- o Connect the oscilloscope to TP11 (B OUT).
- o Adjust VR2 (B PEDESTAL) on the Process VIC3 board so that the pedestal level is zero as in case of G and R pedestal adjustment.

(j) Gamma correction adjustment

- o Remove cap on the lens or set the filter wheel to the position 1.
- o Connect the oscilloscope to TP1 (GIN) and adjust lens iris so that the video signal becomes 0.2V.

Test points :	TP9 (G OUT)	Process board
	TP10 (R OUT)	Process board
	TP11 (B OUT)	Process board
Adjusts :	VR1	Process VIC1 board
	(G GAMMA)	
	VR1	Process VIC2 board
	(R GAMMA)	
	VR1	Process VIC3 board
	(B GAMMA)	

- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to TP9 (G OUT) and trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)
- o Adjust VR1 (G GAMMA) on the Process VIC1 board so that the gray scale waveform is straight. (Fig. 5-6-23)

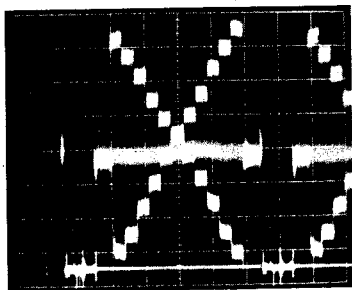


Fig. 5-6-23

- o Connect the oscilloscope to TP10 (R OUT).
- o Adjust VR1 (R GAMMA) on the Process VIC2 board so that the gray scale waveform is straight.
- o Connect the oscilloscope to TP11 (B OUT).
- o Adjust VR1 (B GAMMA) on the Process VIC3 board so that the gray scale waveform is straight.

(k) Camera pedestal adjustment

Test point :	VIDEO OUT
Adjust :	VR2 Process VIC7 board
	(CAMERA PEDESTAL)

- o Cap on the lens or set the filter wheel to the position 4.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or Observe the waveform monitor.
- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- o Adjust VR2 (CAMERA PEDESTAL) so that the camera pedestal level is 0.035V. (Fig. 5-6-24)

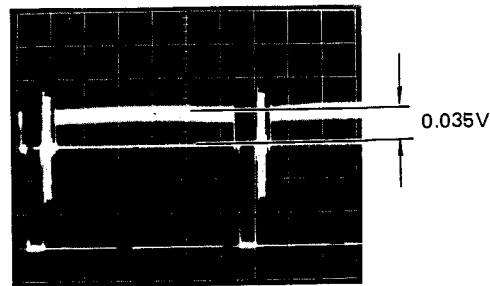


Fig. 5-6-24

(l) Output gain adjustment

Test point :	VIDEO OUT
Adjusts :	VR1 (G GAIN) Process board
	VR2 (R GAIN) Process board
	VR3 (B GAIN) Process board

- o Remove cap on the lens or set the filter wheel to the position 1.
- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Trigger the oscilloscope at H.rate. (Use TP9 (BL), Deflection board.)
- o Adjust VR1 (G GAIN), VR2 (R GAIN) and VR3 (B GAIN) so that the video signal level is 0.7V. (Fig. 5-6-25)

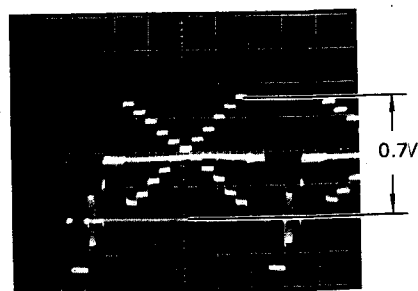


Fig. 5-6-25

(m) White balance fine adjustment

Test point :	VIDEO OUT
Adjusts :	VR2 (R GAIN) Process board
	VR1 (R GAMMA) Process VIC2 board
	VR2 Process VIC2 board
	(R PEDESTAL)
	VR3 (B GAIN) Process board
	VR1 (B GAMMA) Process VIC3 board
	VR2 Process VIC3 board
	(B PEDESTAL)

- o Aim the camera at the gray scale chart.
- o Keep the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Trigger the oscilloscope at H.rate. (Use TP9 (BL), Deflection board.)
- o Fine-adjust VR2 (R GAIN) and VR3 (B GAIN) on the Process board, VR1 (R GAMMA) and VR2 (R PEDESTAL) on the Process VIC2 board and VR1 (B GAMMA) and VR2 (B PEDESTAL) on the Process VIC3 board so that the carrier on the video signal is minimum. (Fig. 5-6-26)

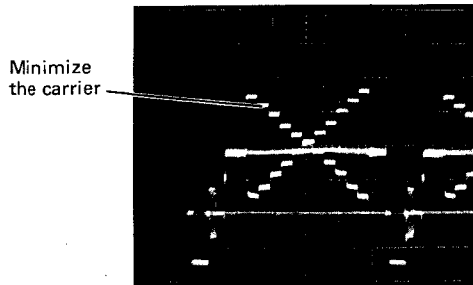


Fig. 5-6-26

(n) White clip adjustment

Test point :	VIDEO OUT	
Adjusts :	VR4	Process board
	(B WHITE CLIP)	
	VR5	Process board
	(R WHITE CLIP)	
	VR6	Process board
	(G WHITE CLIP)	

- o Aim the camera at the gray scale chart.
- o Keep the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)
- o Set the High Gain Selection Switch to +12dB position.
- o Adjust VR6 (G WHITE CLIP), VR5 (R WHITE CLIP) and VR4 (B WHITE CLIP) so that the video signal is clipped at 0.875V and the carrier on the top step of the gray scale waveform is minimum. (Fig. 5-6-27).

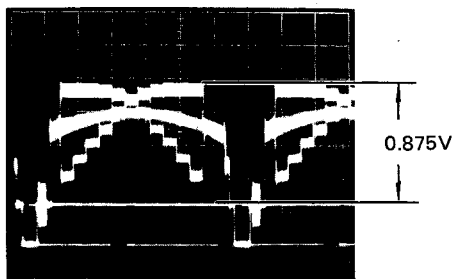


Fig. 5-6-27

(o) Feedback beam control adjustment

Test points :	VIDEO OUT	
	TP1 (G IN)	Process board
	TP2 (R IN)	Process board
	TP3 (B IN)	Process board
Adjusts :	VR32	Deflection board
	(G FBC LEVEL)	
	VR33	Deflection board
	(B FBC LEVEL)	
	VR34	Deflection board
	(R FBC LEVEL)	

- o Set the SW2 (FBC ON/OFF SWITCH) on the Deflection board to ON position.
- o Pan the camera so that the white chip of gray scale positions at the center of the monitor screen.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)
- o Adjust the lens iris so that the video output level is 0.7V. (Fig. 5-6-28)

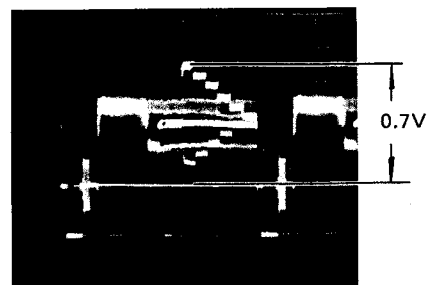


Fig. 5-6-28

- o Connect the oscilloscope to TP1 (G IN).
- o Note the peak-to-peak signal level. (Fig. 5-6-29)

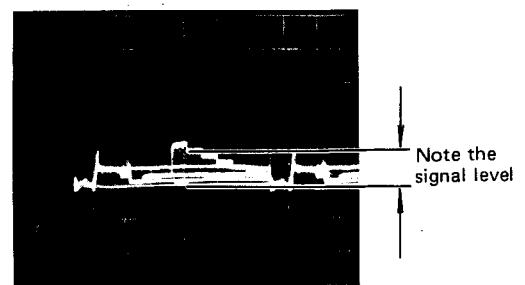


Fig. 5-6-29

- o Set the lens iris fully opened.
- o Adjust VR32 (G FBC LEVEL) so that the peak-to-peak signal level is four (4) times of the noted level. (Fig. 5-6-30)

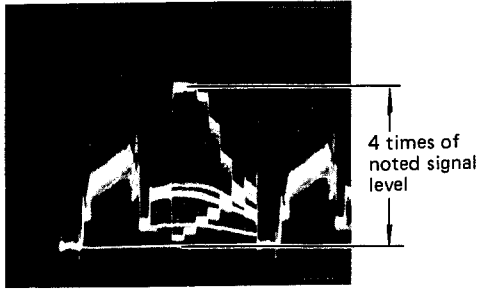


Fig. 5-6-30

- o Adjust the feedback beam control for red and blue signals as in the case of the green signal.
- o Adjust the lens iris so that the video output level is 0.7V. (Fig. 5-6-28)
- o Connect the oscilloscope to TP2 (R IN) and TP3 (B IN).
- o Note the peak-to-peak signal level of R and B signal. (Fig. 5-6-29)
- o Set the lens iris fully opened.
- o Adjust VR33 (B FBC LEVEL) and VR34 (R FBC LEVEL) so that the peak-to-peak signal level of R and B signals are four (4) times of the noted level. (Fig. 5-6-30)
- o Pan the camera right and left and confirm that the trailing side of white chip of gray scale chart has no color. If not, readjust above steps.

(p) Level indicator adjustment

Adjust :	VR1	Process VIC9 board
	(ZEBRA LEVEL)	
Observe :	Viewfinder	

- o Aim the camera at the logarithmic gray scale chart.
- o Set the INDICATOR ON/OFF SWITCH on the side of camera to ON position.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Set the lens iris so that the video signal level is 0.7V.
- o Adjust VR1 (ZEBRA LEVEL) so that the white chip (top step) of the gray scale does not turn into ZEBRA pattern on the viewfinder.
- o Set the lens iris so that the video signal level is 0.73V.
- o Adjust VR1 (ZEBRA LEVEL) so that the white chip (top step) of the gray scale turns into ZEBRA pattern on the viewfinder.
- o Repeat this procedure until the white chip of the gray scale turns into ZEBRA pattern at 0.73V unit and does not turn into ZEBRA pattern at 0.7V unit.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced

(q) Nega white level adjustment

Test point :	VIDEO OUT
Adjust :	VR1 Process VIC8 board
	(NEGA WHITE LEVEL)

- o Aim the camera at the logarithmic gray scale chart.
- o Set the NEGA/POSI SWITCH on the side of camera to NEGA position.
- o Connect the oscilloscope to the terminated VIDEO OUT signal or observe the waveform monitor.
- o Adjust VR1 (NEGA WHITE LEVEL) on the Process VIC8 board so that the video signal level is 0.7V.
- o Reset the NEGA/POSI SWITCH on the side of camera to POSI position.

(r) Title color phase adjustment

Test point :	VIDEO OUT
Adjusts :	CT1 Process board
	(EXT TITLE COLOR PHASE)
	VR2 Process VIC9 board
	(EXT TITLE GAIN)
Observe :	Color video monitor

- o Connect the character generator WV-KB12 to the EXT TITLE connector on the camera.
- o Press the EDIT button on the character generator and select the title color to red by pressing the TITLE CLR button.
- o Set the NEGA/POSI SELECTION switch to NEGA position.
- o Observe the vectorscope and adjust CT1 (EXT TITLE COLOR PHASE) so that the red vector becomes 108° on the vector scope. (Fig. 5-6-31)

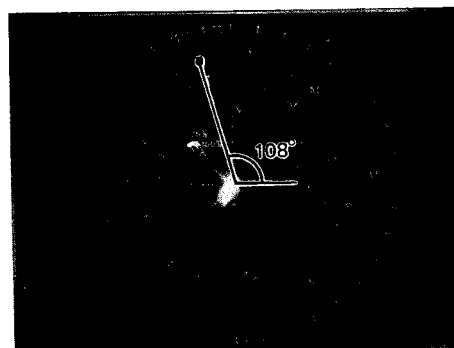


Fig. 5-6-31

- o Reset the NEGA/POSI SELECTION switch to POSI position.
- o Select the title color to white color by pressing the TITLE CLR button.
- o Set the characters by pressing the character key buttons.
- o Observe the color video monitor.
- o Adjust VR2 (EXT TITLE GAIN) on the Process VIC9 board so that the characters become sharp.

5-7 Auto Board Adjustment

(a) Character size adjustment

Adjust :	VR1	Auto (A) board (CHARACTER SIZE)
Observe :	Color monitor	

- o Connect the character generator WV-KB12 to EXT title connector.
- o Press EDIT button and select the word size to L size by pressing the WORD SIZE button.
- o Adjust VR1 (CHARACTER SIZE) so that the both side spaces between dots and screen edges become equal (A). (Fig. 5-7-1)

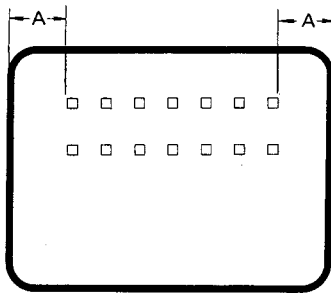


Fig. 5-7-1

(b) Auto black control offset adjustment

Adjusts :	VR2	Auto (B) board (G ABC)
	VR3	Auto (B) board (R/B ABC)
Observe :	Vectorscope	

- o Set the SW1 (ABC TEST SWITCH) on the Auto (A) board to ON position.
- o Observe the vectorscope and adjust VR2 (G ABC) and VR3 (R/B ABC) on the Auto (B) board so that the vector on the vectorscope get into center position on the vectorscope. (Fig. 5-7-2)

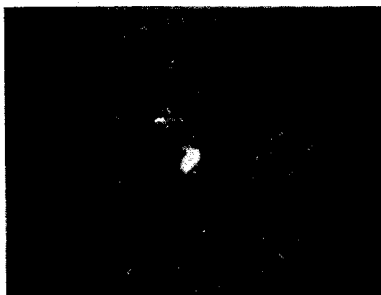


Fig. 5-7-2

- o Reset SW1 (ABC ON/OFF SWITCH) on the Auto (B) board to OFF position.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

5-8 Lens Control Adjustment

- o Disassemble the Zoom Lens WV-LZ33/10 while referring to 2-2 Lens Grip on page 2-2.
- o Set the Iris Selection/Manual Control Knob to the AUTO position.

(a) Zoom balance and speed adjustment

Test point :	TP1	Lens control board (ZOOM CONT)
Adjusts :	VR1	Lens control board (ZOOM BALANCE)
	VR2	Lens control board (ZOOM SPEED)

- o Connect the digital voltmeter (DVM) probe between TP1 (ZOOM CONT) and chassis (GROUND).
- o Keep pushing the zoom switch on the lens unit to T (Tele) side and note the voltage level as A volt.
- o Keep pushing the zoom switch to W (Wide) side and note the voltage level as B volt.
- o Adjust VR1 (ZOOM BALANCE) so that the voltage level of A and B is equal.
- o Keep pushing the zoom switch on the lens unit to T (Tele) side or W (Wide) side.
- o Adjust VR2 (ZOOM SPEED) for $5.05V \pm 0.05V$.

(b) Lens iris adjustment

Test point :	VIDEO OUT	
Adjust :	VR2	Lens grip (IRIS PRESET)
	VR1	Lens grip (IRIS FINE)

- o Turn VR1 (IRIS FINE) on the Lens control board to center (Click) position.
- o Aim the camera at the logarithmic gray scale chart.
- o Observe waveform monitor or connect the oscilloscope to the terminated VIDEO OUT signal and trigger the oscilloscope at H rate. (Use TP9 (BL), Deflection board.)
- o Adjust VR2 (IRIS PRESET) so that the video output level is 0.7V. (Fig. 5-8-1)

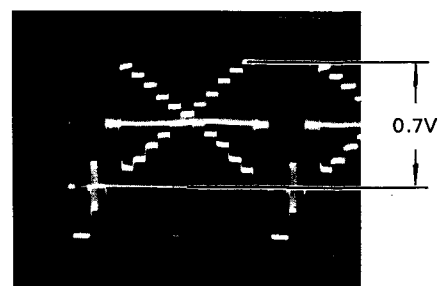


Fig. 5-8-1

(c) AIC level adjustment

Test point : VIDEO OUT

Adjust : VR16 (IRIS SET) Deflection board

- o Turn the Power Switch to OFF position.
- o Remove the lens WV-LZ33/10 by turning the lens hold ring/knob counterclockwise after disconnecting the lens connector.
- o Attach the lens WV-LZ32/10 into the lens mount and turn the lens hold ring/knob clockwise to hold the lens securely. Connect the lens connector.
- o Disconnect the AC Adaptor WV-PS31 from the camera.
- o Lift up the cover for the 32 pin junction connector on the camera.
- o Mount the RCU/Gen-Lock Adaptor WV-AD33 on the camera while connecting the 32 pin junction connector on the camera and the RCU/Gen-Lock Adaptor WV-AD33.
- o Turn the two lock screws clockwise to mount the RCU/Gen-Lock Adaptor WV-AD33 securely.
- o Connect the 14 pin cable 14C-30 between the RCU/Gen-Lock Adaptor WV-AD33 and RCU WV-RC33.
- o Set the Lens Control Selection Switch (IRIS AUTO, MAN, REM) on the lens to the REM position.
- o Set the Lens Iris Control (IRIS AUTO-CLOSE/OPEN) on the RCU WV-RC33 to the AUTO position.
- o Set the Power Switch (POWER BATT, OFF, VTR/RCU) on the camera to the VTR/RCU position.
- o Set the Power Switch on the front of RCU WV-RC33 to ON position.
- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to the terminated VIDEO OUT connector on the rear of RCU WV-RC33 or connect the VIDEO OUT connector on the rear of RCU WV-RC33 to the waveform monitor. (Fig. 5-8-2)

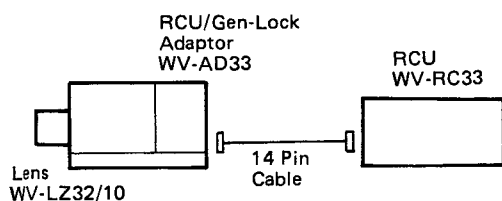


Fig. 5-8-2

- o Trigger oscilloscope at H.rate. (Use TP9 (BL), Deflection board.)
- o Adjust VR16 (IRIS SET) so that the video signal level is 0.7V. (Fig. 5-8-3)

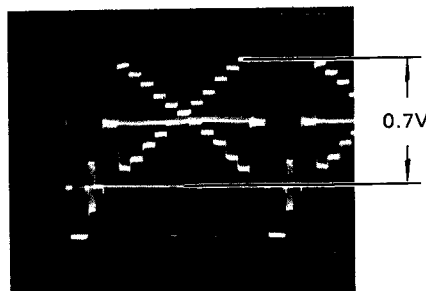


Fig. 5-8-3

- o Disconnect the 14 pin connector of RCU/Gen-Lock Adaptor WV-AD33 from RCU WV-RC33 and VIDEO OUT connector of RCU WV-RC33 from oscilloscope or waveform monitor.
- o Loosen the two screws which hold the RCU/Gen-Lock Adaptor WV-AD33 and remove the RCU/Gen-Lock Adaptor WV-AD33.
- o Mount the AC Adaptor WV-PS31 to the camera.
- o Disconnect the lens connector and remove the lens WV-LZ32/10 from the camera.
- o Mount the lens WV-LZ33/10 and connect the lens connector to the camera.

5-9 Auto Tracing White-Balance Adjustment

- o Set the Iris Selection/Manual Control Knob to the AUTO position.
- o Set the White Balance Selection Switch on the right side of camera to ATW position.
- o Distance between the camera and test chart should be 1.5m.
- o Set the filter wheel to the position 1.

Note: Do not adjust the Auto Tracing White-Balance Adjustment under the fluorescent lamp.

(a) White balance sensor adjustment

Adjusts : VR1 Auto tracing white-balance board (R ATW ADJ)
 VR2 Auto tracing white-balance board (B ATW ADJ)
 Observe : Vectorscope

- o Aim the camera at the white chart.
- o Observe the vectorscope.
- o Adjust VR1 (R ATW ADJ) and VR2 (B ATW ADJ) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-9-1)



Fig. 5-9-1

(b) ATW sensor gain adjustment

Adjusts :	VR4	Auto tracing white-balance board (R GAIN)
	VR5	Auto tracing white-balance board (B GAIN)
Observe :	Vectorscope	

- o Aim the camera at the white chart.
- o Set the color temperature conversion filter which converts 3200°K to 5200°K in front of the lens and faceplate of ATW sensor.
- o Observe the vectorscope.
- o Adjust VR4 (R GAIN) and VR5 (B GAIN) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-9-2)



Fig. 5-9-2

- o Remove the color temperature conversion filter from the front of the lens and faceplate of ATW sensor.
- o Confirm that the vector on the vectorscope positions at the center of vectorscope.
- o If not, repeat the adjustment of item (a) and (b) for auto tracing white-balance adjustment.

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

5-10 1.5" Viewfinder WV-VF33 Adjustment

- o Disassemble the 1.5" viewfinder WV-VF33 while referring to 2-3 1.5" viewfinder WV-VF33 on page 2-2.
- o Set the Iris Selection/Manual Control Knob to the AUTO position.

(a) AFC adjustment

Test point :	TP1 (AFC)	EVF board
Adjust :	VR2 (AFC ADJ)	EVF board

- o Connect the digital voltmeter (DVM) probe between TP1 (AFC) and chassis (GROUND).
- o Adjust VR2 (AFC ADJ) for 2.6V and confirm that the picture is held horizontally.

(b) Centering magnets adjustment

Adjusts :	L2 (H. SIZE)	EVF board
	VR1 (V. SIZE)	EVF board
Observe :	Viewfinder	

- o Reduce picture size using L2 (H. SIZE) and VR1 (V. SIZE) so that the entire raster is observed on the viewfinder.
- o Aim the camera at the registration chart.
- o Adjust the centering magnets so that the raster comes to the center of viewfinder screen. (Fig. 5-10-1)

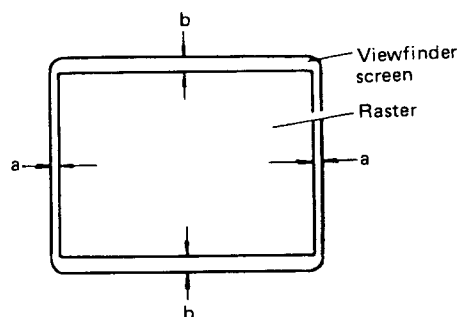


Fig. 5-10-1

(c) Picture tilt adjustment

Adjust : Deflection coil
Observe : Viewfinder

- o Loosen the deflection coil holding screw. (Fig. 5-10-2)
- o Observe the viewfinder and turn the deflection coil so that the raster is straight.
- o Tighten the deflection coil holding screw.

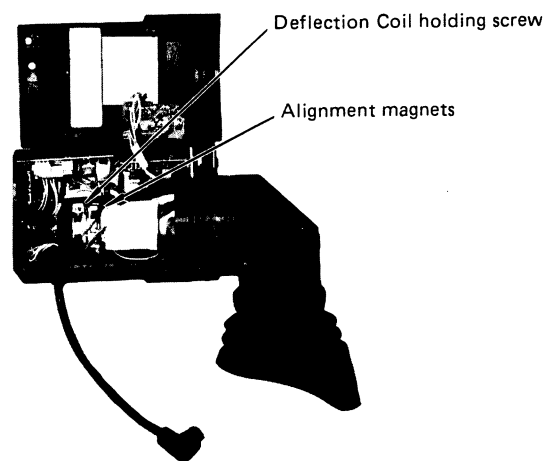


Fig. 5-10-2

(d) Horizontal and vertical size adjustment

Adjusts : L2 (H. SIZE) EVF board
VR1 (V. SIZE) EVF board
Observe : Viewfinder

- o Aim the camera at the registration chart.
- o Adjust L2 (H. SIZE) and stop just before horizontal edges of raster touching to the both edges of viewfinder screen.
- o Adjust VR1 (V. SIZE) so that the circle in the chart is as nearly a true circle as possible.
- o Confirm that the four corners of raster are observed on the viewfinder. If not, readjust the centering magnets.

(e) Sub-brightness adjustment

Adjusts : VR3 Front of EVF unit (CONTRAST)
VR4 (BRIGHT) Front of EVF unit
VR5 EVF board (SUB-BRIGHT)
Observe : Viewfinder

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

- o Cap on the lens or set the filter wheel to the position 4.
- o Set VR3 (CONTRAST) fully clockwise and VR4 (BRIGHT) fully counterclockwise.
- o Adjust VR5 (SUB-BRIGHT) so that the raster at the point where becomes the brightest but the retrace line is not appear.

(f) Contrast and brightness adjustment

Adjusts : VR3 Front of EVF unit (CONTRAST)
VR4 Front of EVF unit (BRIGHT)
Observe : Viewfinder

- o Aim the camera at the logarithmic gray scale chart.
- o Remove cap on the lens or set the filter while to the position 1, adjust VR3 (CONTRAST) and VR4 (BRIGHT) so that the black-and-white chip gradations will be the same on the viewfinder as that in the monitor.

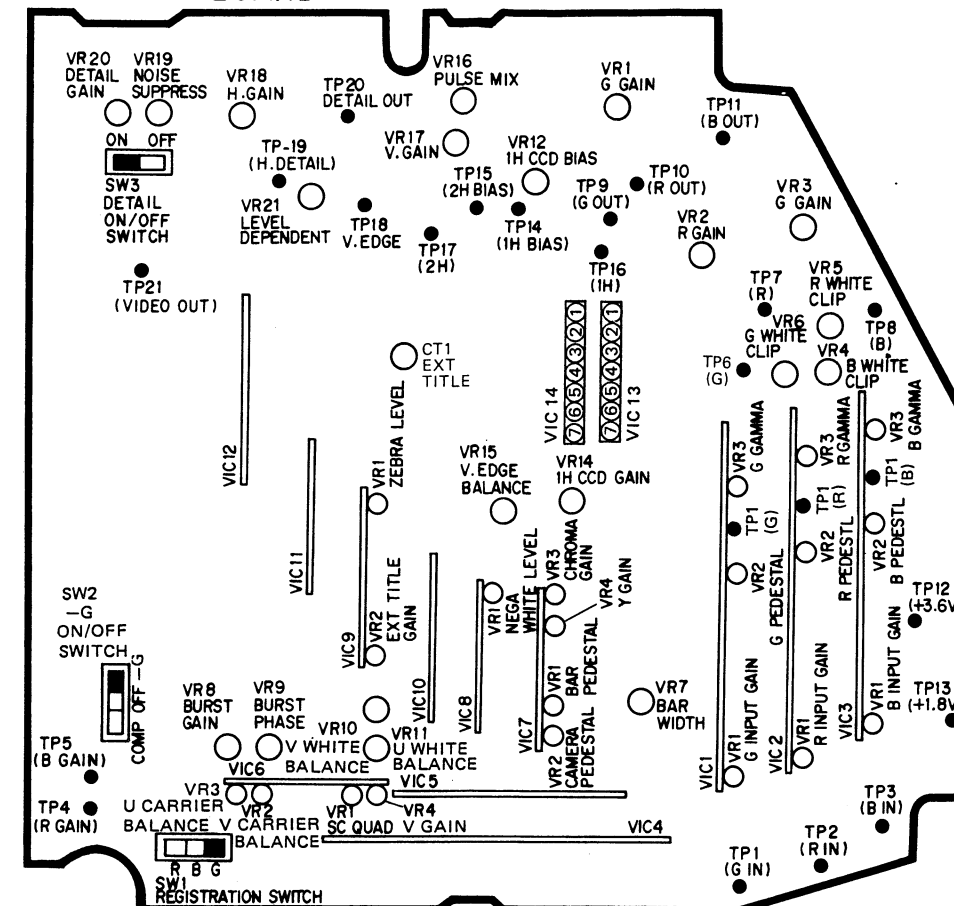
(g) Focus adjustment

Adjust : VR6 (FOCUS) EVF board
Observe : Viewfinder

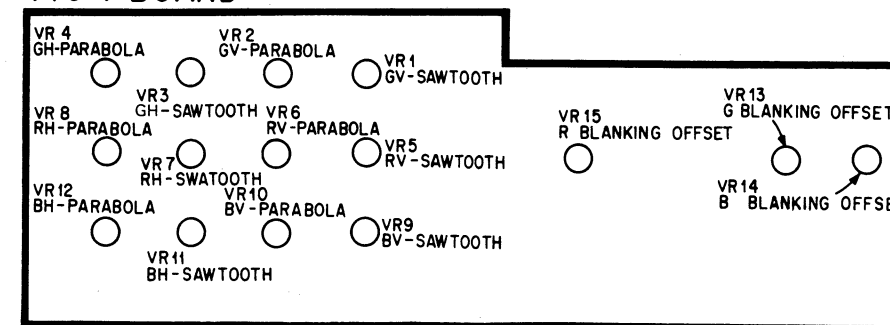
- o Aim the camera at the resolution chart.
- o Adjust VR6 (FOCUS) for best resolution in the viewfinder.

6. LOCATION OF TEST POINTS AND ADJUSTMENT CONTROLS

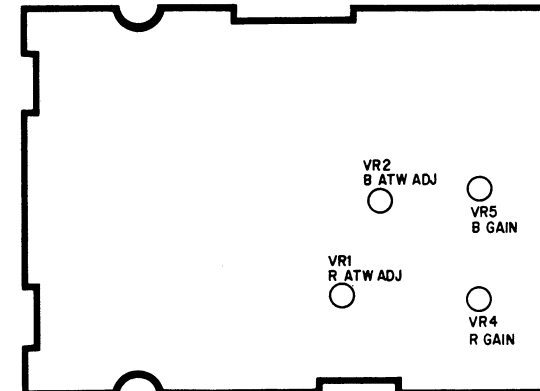
PROCESS BOARD



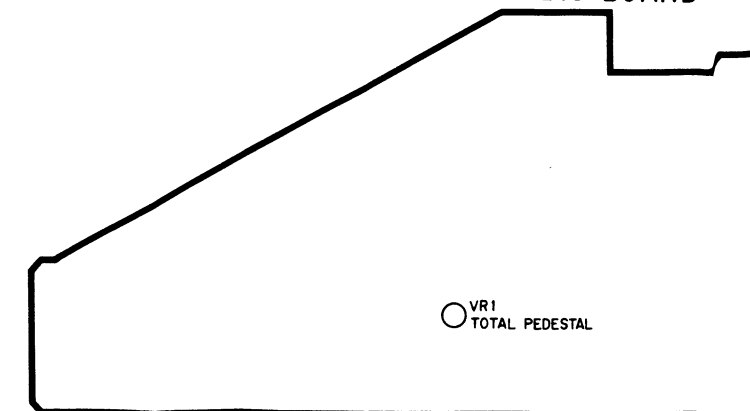
VIC 4 BOARD



AUTO TRACING BOARD

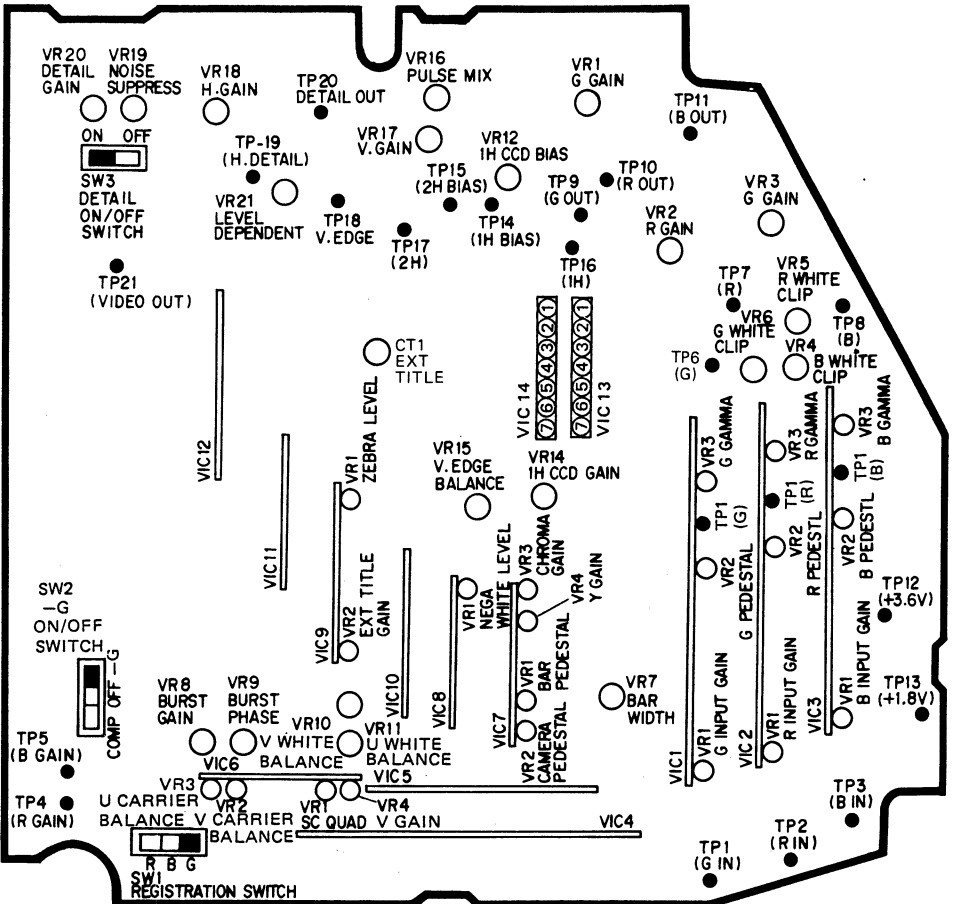


AUDIO BOARD

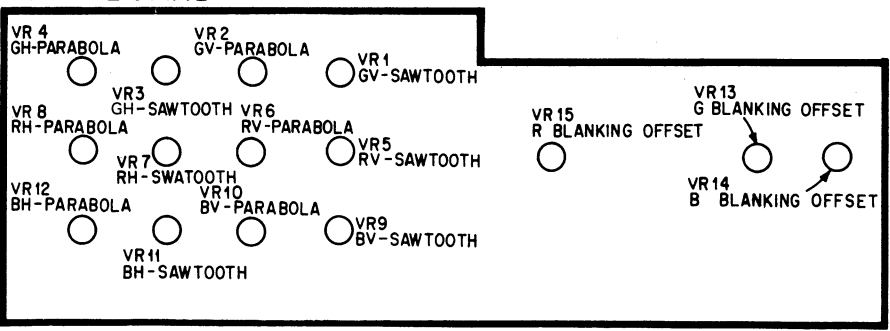


6. LOCATION OF TEST POINTS AND ADJUSTMENT CONTROLS

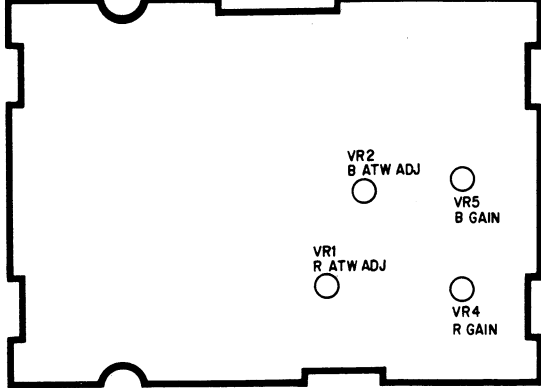
PROCESS BOARD



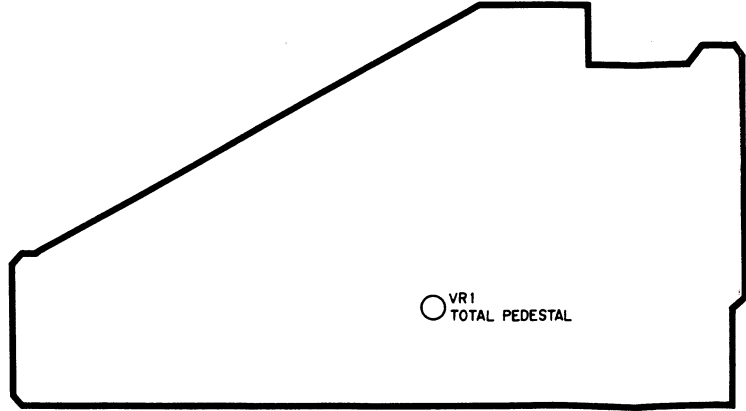
VIC 4 BOARD



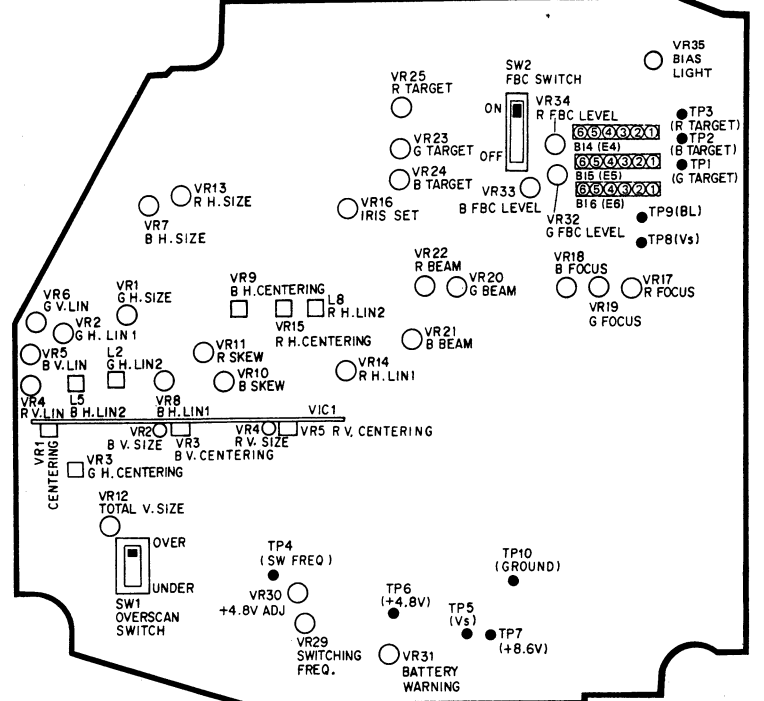
AUTO TRACING BOARD



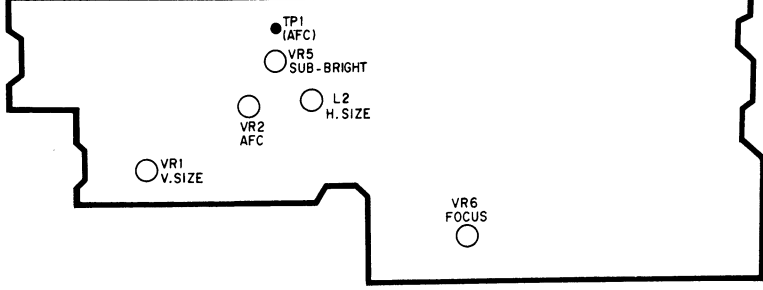
AUDIO BOARD



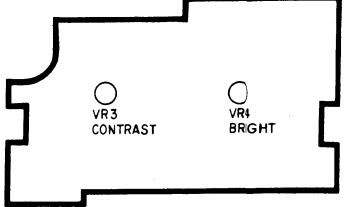
DEFLECTION BOARD



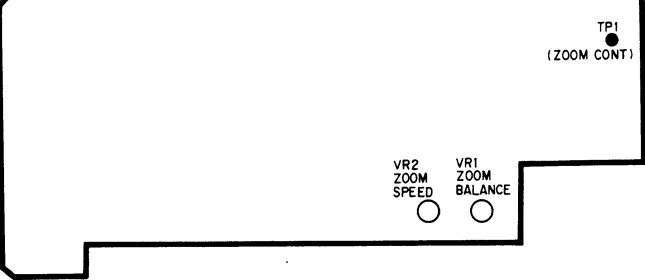
EVF BOARD



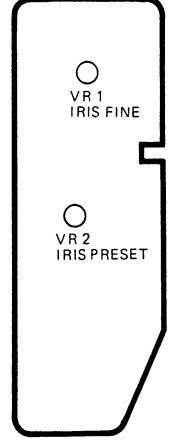
EVF VR BOARD



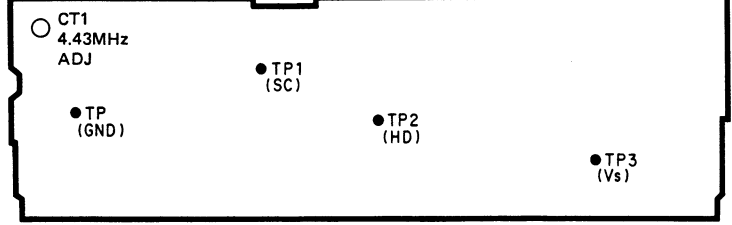
LENS CONTROL BOARD



IRIS VR BOARD



SYNC BOARD (VIC1)





2-40

Numerical

Let
A
B
C
D
E
F
G
H
J
K
L
M

• L



A1

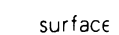
N2

S3

4. Precz

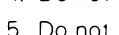
1. Make s

the chi



3. Do not

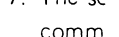
4 Do not



6. It is re

be used

7. The ac



8. Do no

9. Mainte

when

4-1 Rem

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter pre-

cedes the number and expresses a numerical value to be

multiplied by the number which follows.



Note:

7. CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.



Transistor Number

Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ → 2SD602 – Q
YQ → 2SD601 – Q
1BS → 2SB814 – S

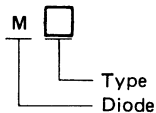
Appearance and Symbols



	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

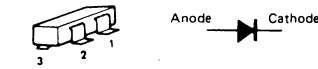
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.



Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

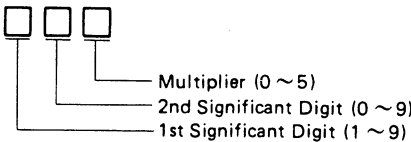
Appearance and Symbols



	1	2	3
MA28/28W/28T	—	Anode	Cathode
MA151K/152K	—	Anode	Cathode
MA151A/152A	—	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

2. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.



EXAMPLE:

330 → 33 × 10⁰ = 33 ohms
561 → 56 × 10¹ = 560 ohms
123 → 12 × 10³ = 12 kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

3. Chip Capacitor

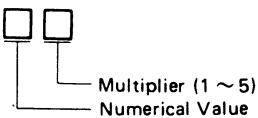
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 → 0.5 pF 2.5 → 2.5 pF
.75 → 0.75 pF 33 → 33 pF
1 → 1 pF 82 → 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

EXAMPLE:

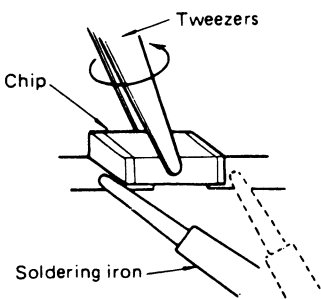
A1 → 10 × 10¹ = 100 pF
N2 → 33 × 10² = 3300 pF
S3 → 47 × 10³ = 47000 pF

4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

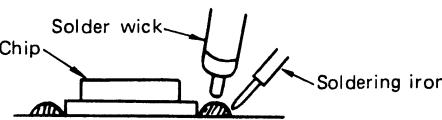
4-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
 2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
- Note: Be careful not to damage other chips.

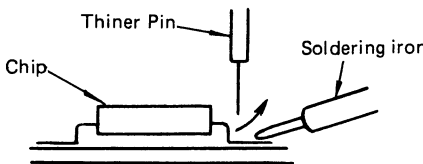


4-2 Removal (IC)

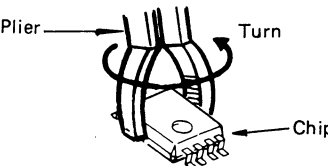
1. Add the solder wick and solder iron to each lead of the IC and remove solder.



2. Add the solder iron to each lead of the IC and left each lead of the IC using thinner pin.

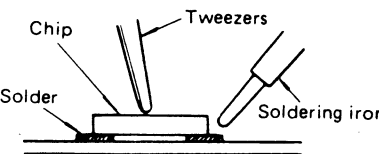


3. Remove IC turning it with plier.

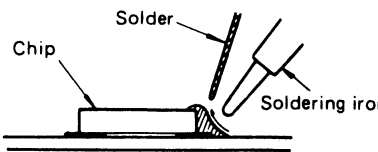


4-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



3. Solder both ends of chip (three leads for chip transistor).



Service Manual

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views

PAL Colour Video Camera
WV-V3 Series

CONTENTS

BLOCK DIAGRAM

Audio Board	3-2, 3
Sync Board	3-4, 5
Deflection Board	3-6 ~ 9
Auto (A), (B) and (C) Board	3-10 ~ 13
Lens Control Board	3-14, 15
EVF WV-VF33	3-16, 17
Process Board	3-18 ~ 21

SCHEMATIC DIAGRAM

Pre-Preamplifier and Preamplifier Board	3-1
Process Board	3-22 ~ 26
Deflection Board	3-37 ~ 40
Auto (A), (B) and (C) Board	3-44 ~ 47
Auto Tracing White-Balance Board	3-48, 49
Sync Board	3-49 ~ 51
Audio Board	3-58, 59
Lens Control Board	3-60, 61
EVF WV-VF33	3-68, 69
Mother Board	3-70, 71

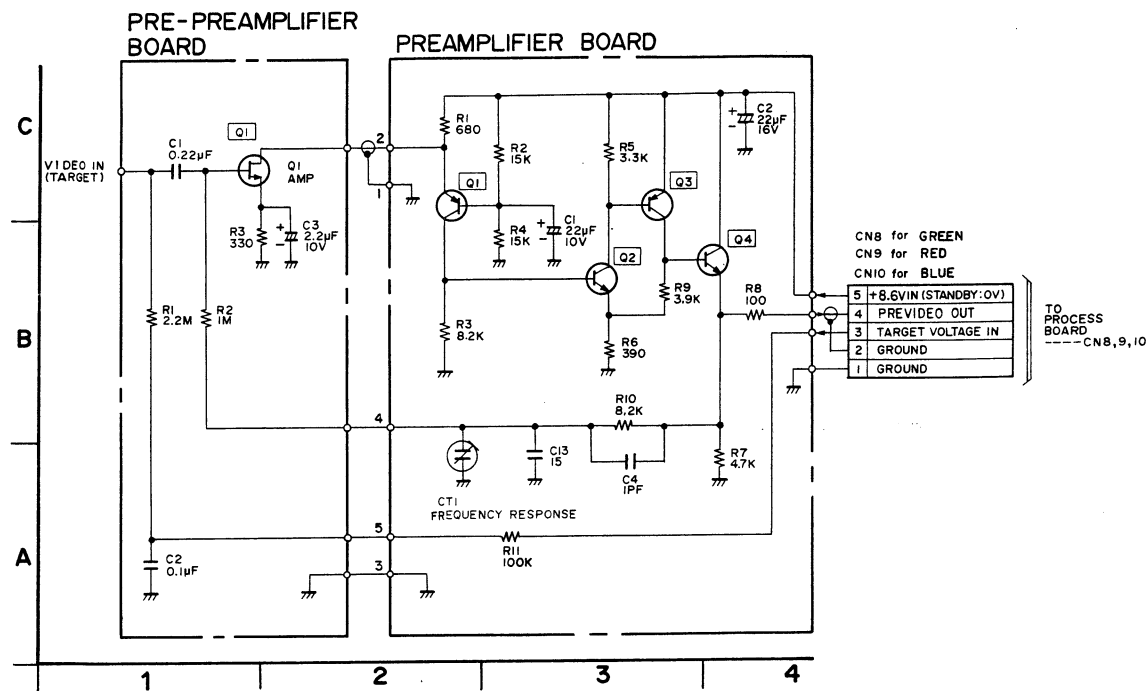
CONDUCTOR VIEW

Pre-Preamplifier and Preamplifier Board	3-1
Process Board	3-27 ~ 31
Deflection Board	3-32 ~ 36
Auto (A), (B) and (C) Board	3-41 ~ 43
Auto Tracing White-Balance Board	3-48, 49
Sync Board	3-52 ~ 54
Audio Board	3-55 ~ 57
Lens Control Board	3-62 ~ 64
EVF WV-VF33	3-65 ~ 67
Mother Board	3-72 ~ 74

WIRING DIAGRAM	3-75 ~ 77
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Vol. 3

SCHEMATIC DIAGRAM OF PRE-PREAMPLIFIER AND PREAMPLIFIER BOARD



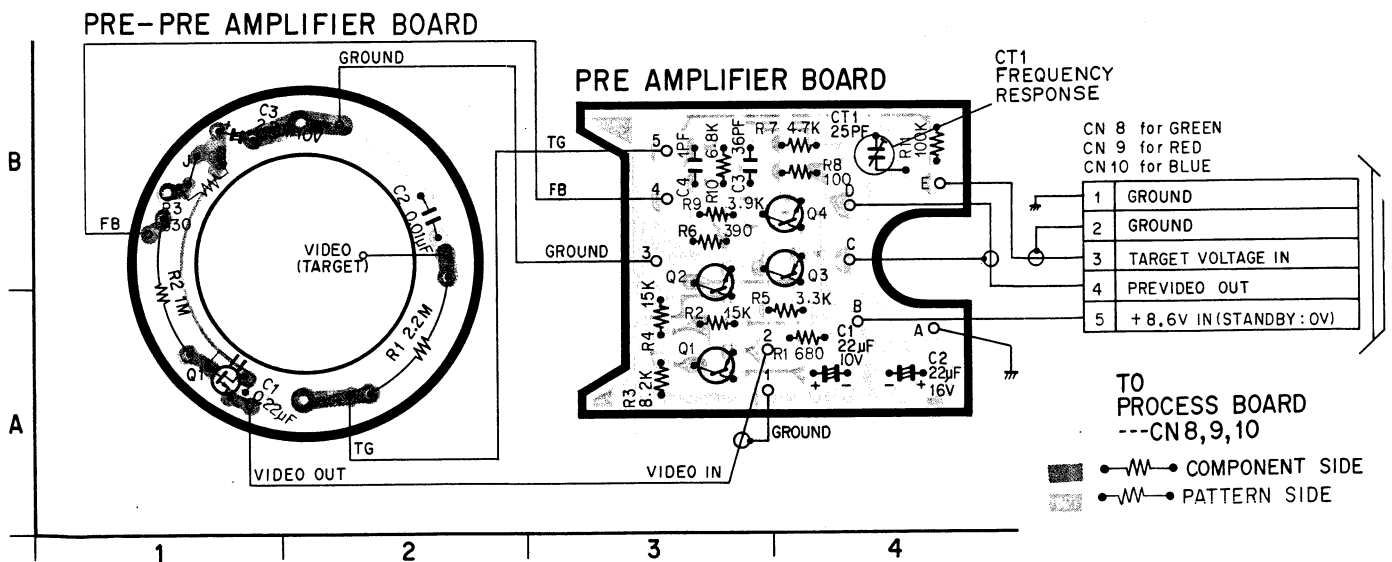
Pre-Preamp Board

Preamp Board

Q1 2SK316Q (1k) C1

Q1 2SA1022-BC (E) C2
Q2 2SC2404-CD (U) B3
Q3 2SA1022-BC (E) C3
Q4 2SC2404-CD (U) B4

CONDUCTOR VIEW OF PRE-PREAMPLIFIER BOARD AND PREAMPLIFIER BOARD



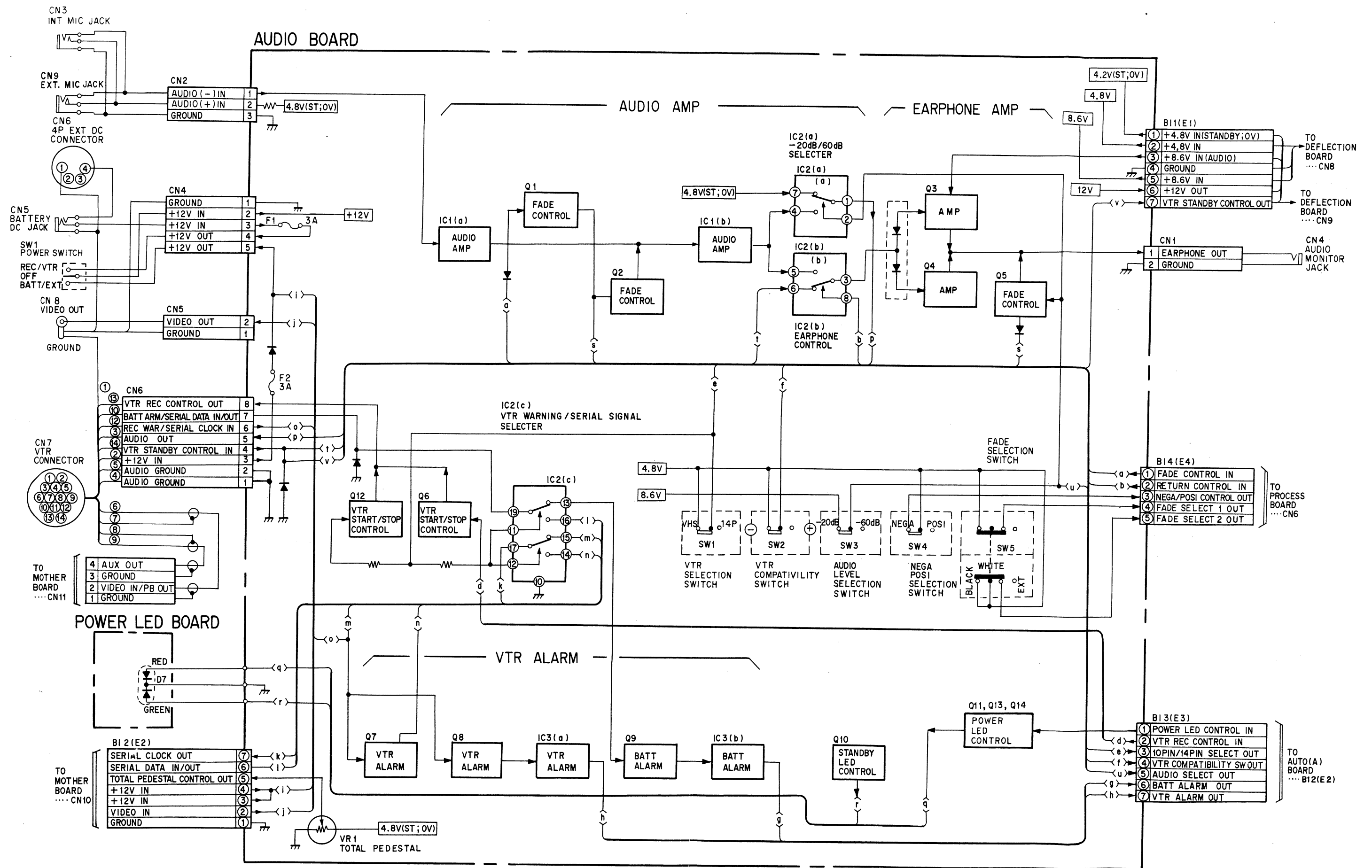
Pre-Preamp Board

Preamp Board

2SA1022-BC 2SK316Q Q1 2SK316Q (1k)

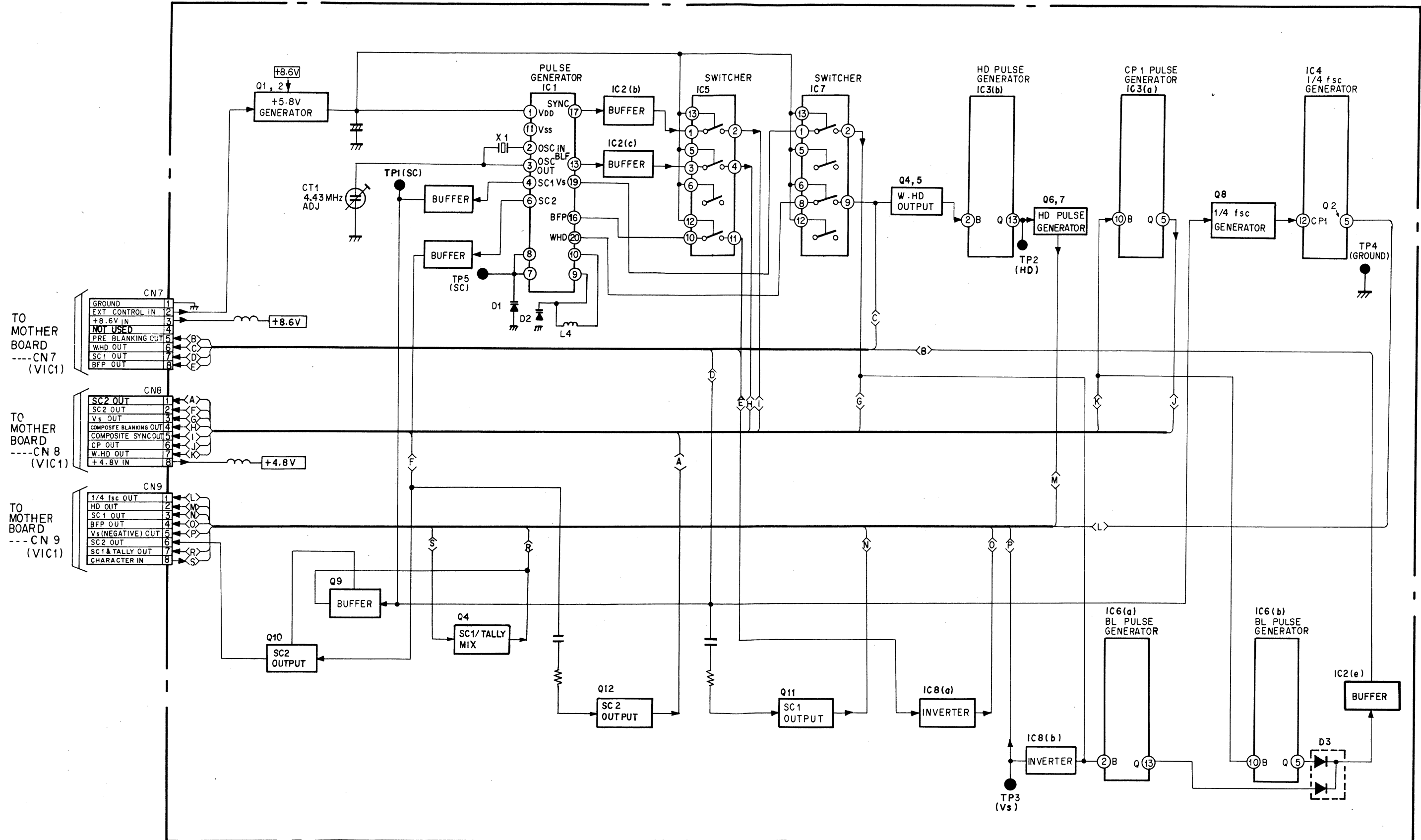
2SC2404-CD Q2 2SA1022-BC (E)
2SC2404-CD Q3 2SC2404-CD (U)
2SC2404-CD Q4 2SC2404-CD (U)

BLOCK DIAGRAM OF AUDIO BOARD



BLOCK DIAGRAM OF SYNC BOARD

SYNC (VIC1) BOARD



DEFLECTION BOARD

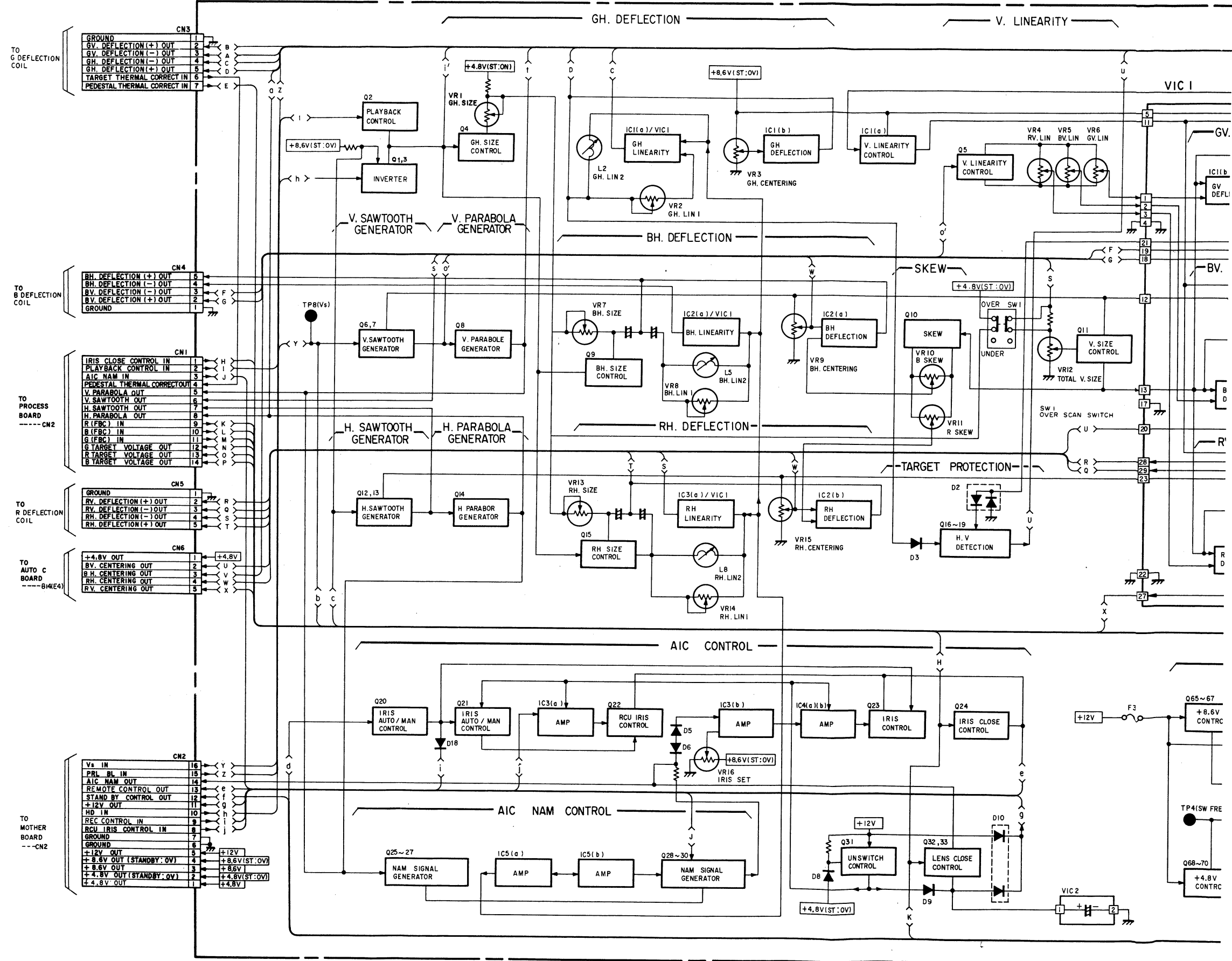
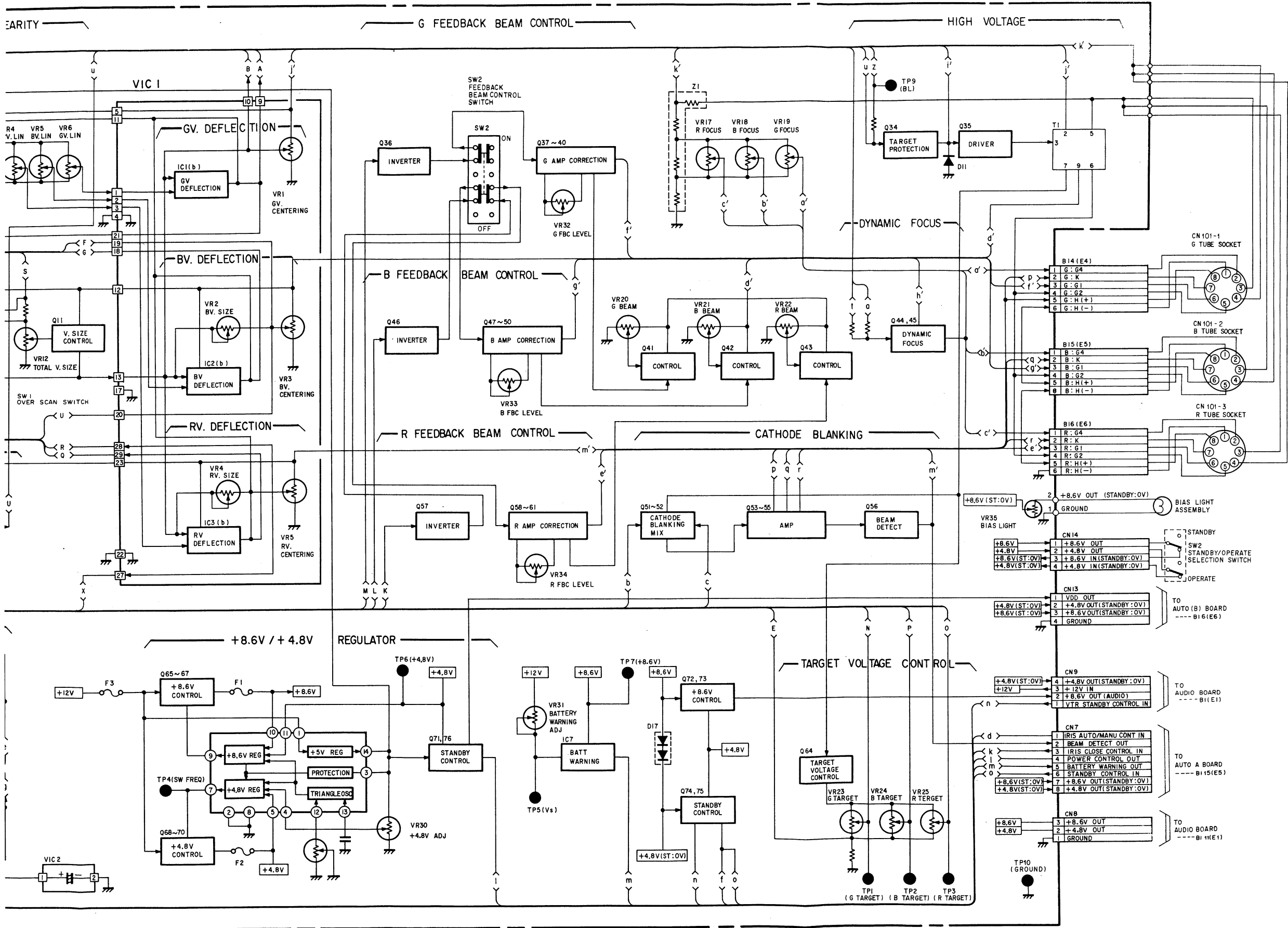
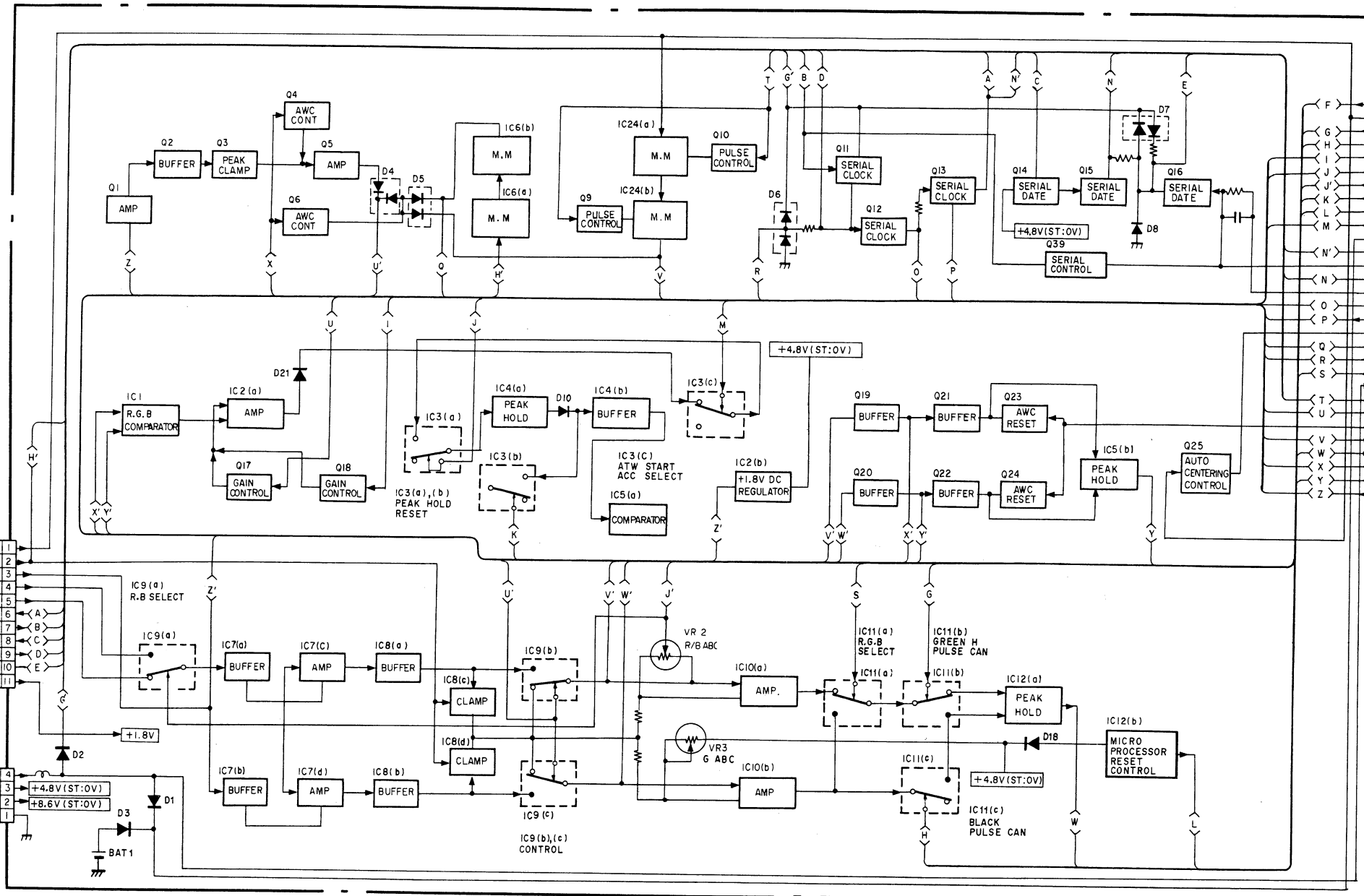


DIAGRAM OF DEFLECTION BOARD

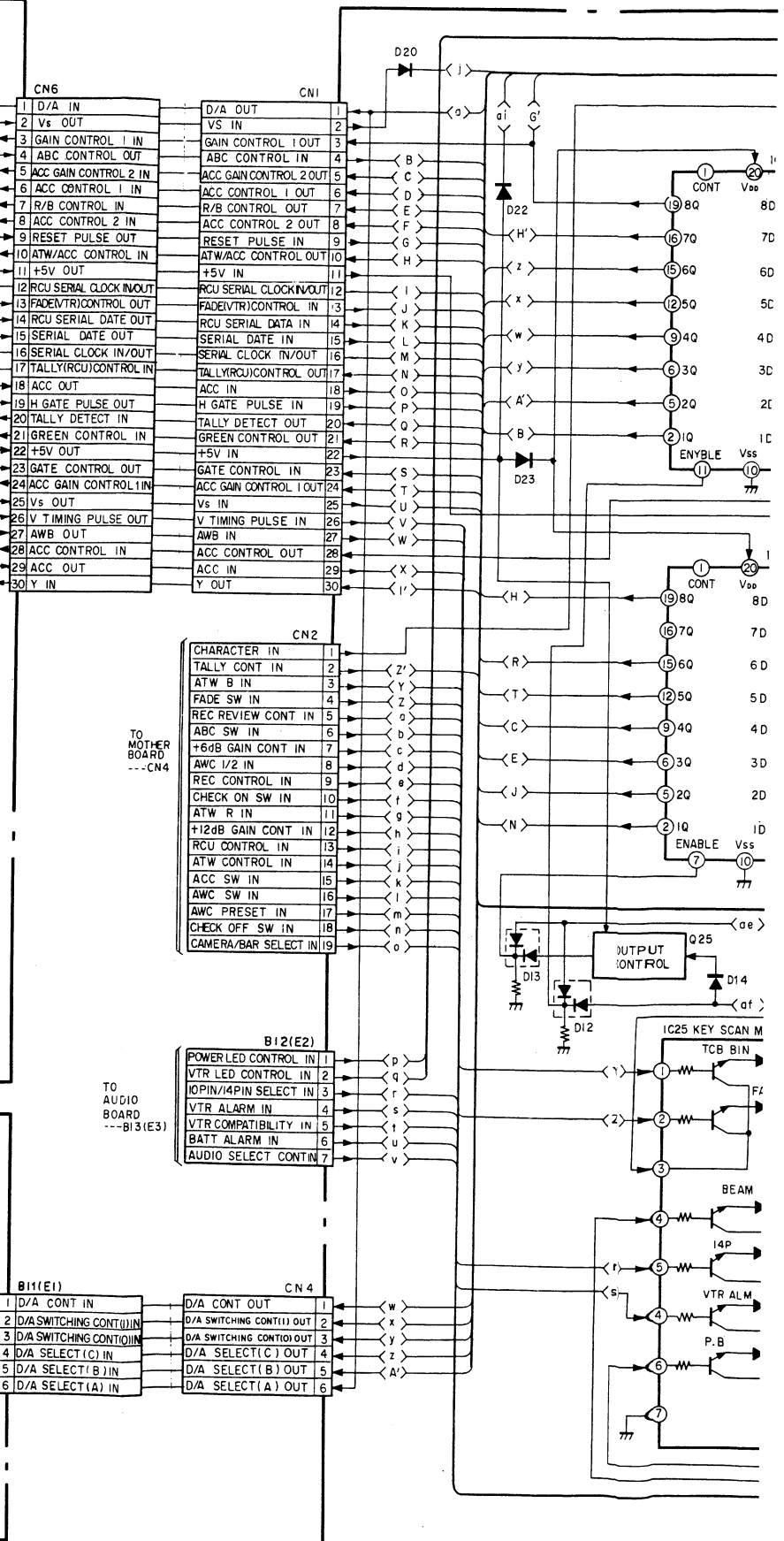


BLOCK DIAGRAM OF AUTO (A), (B) AND

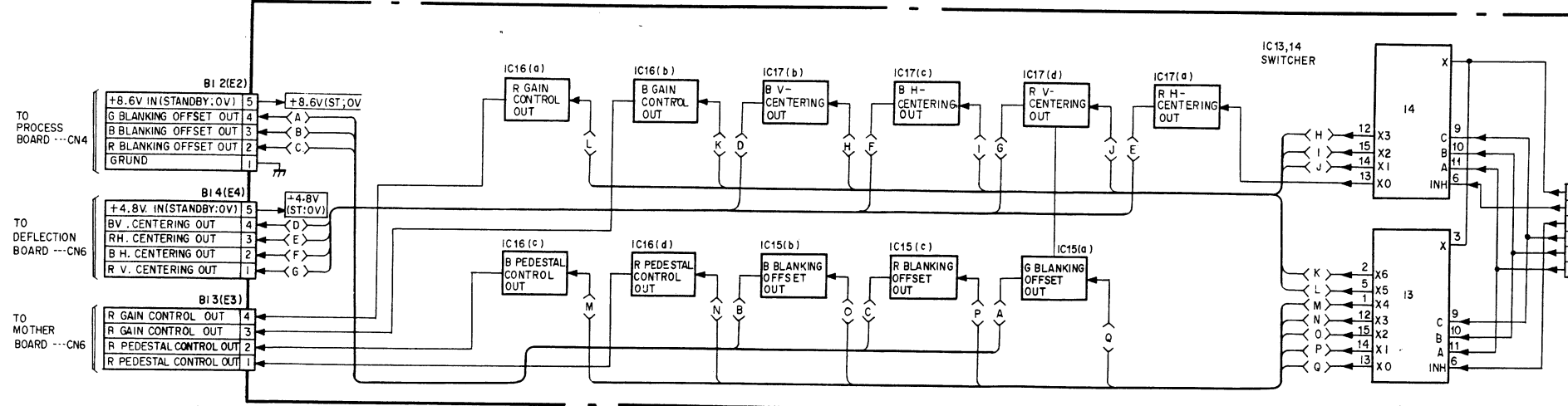
AUTO (B) BOARD



AUTO (A) BOARD

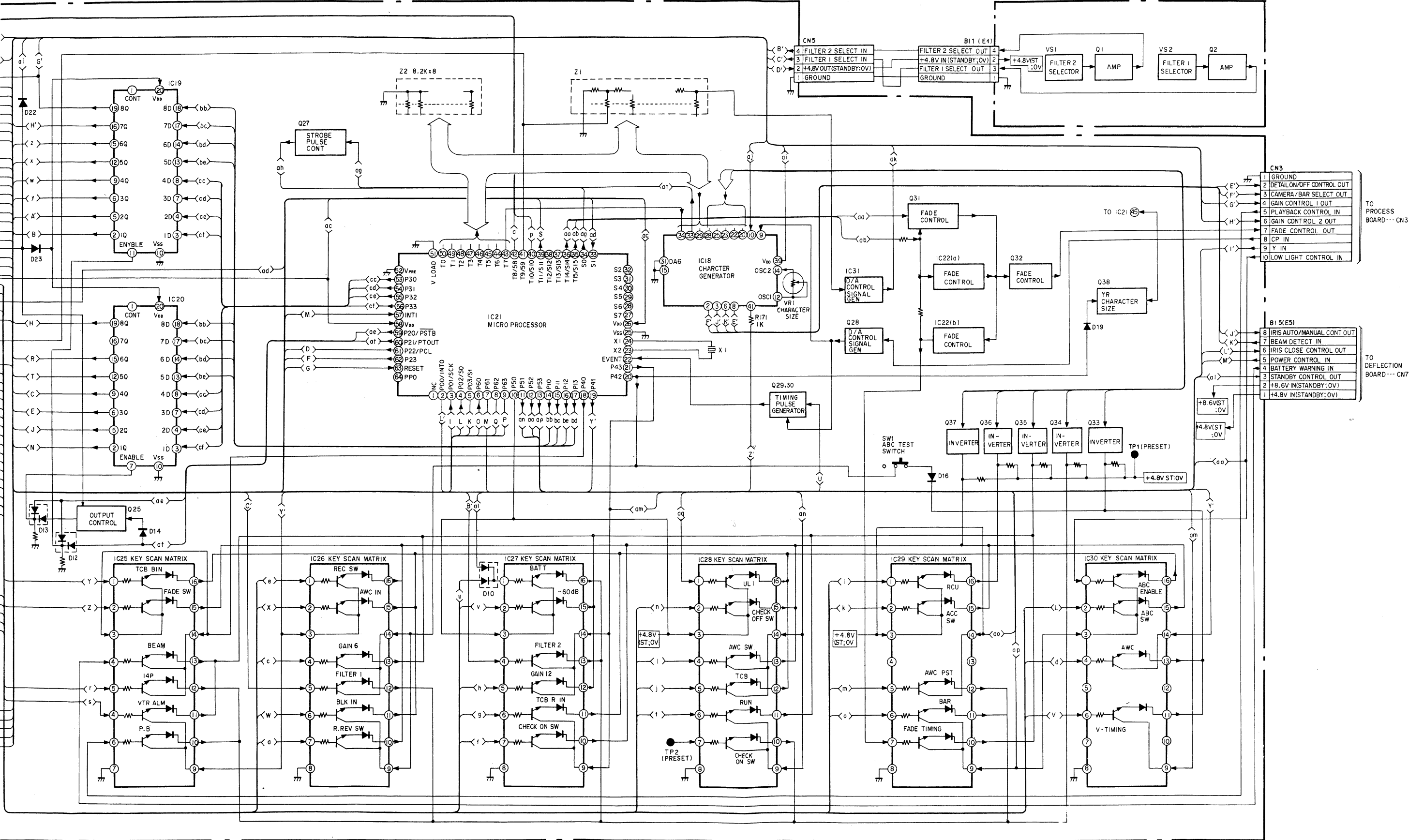


AUTO(C) BOARD

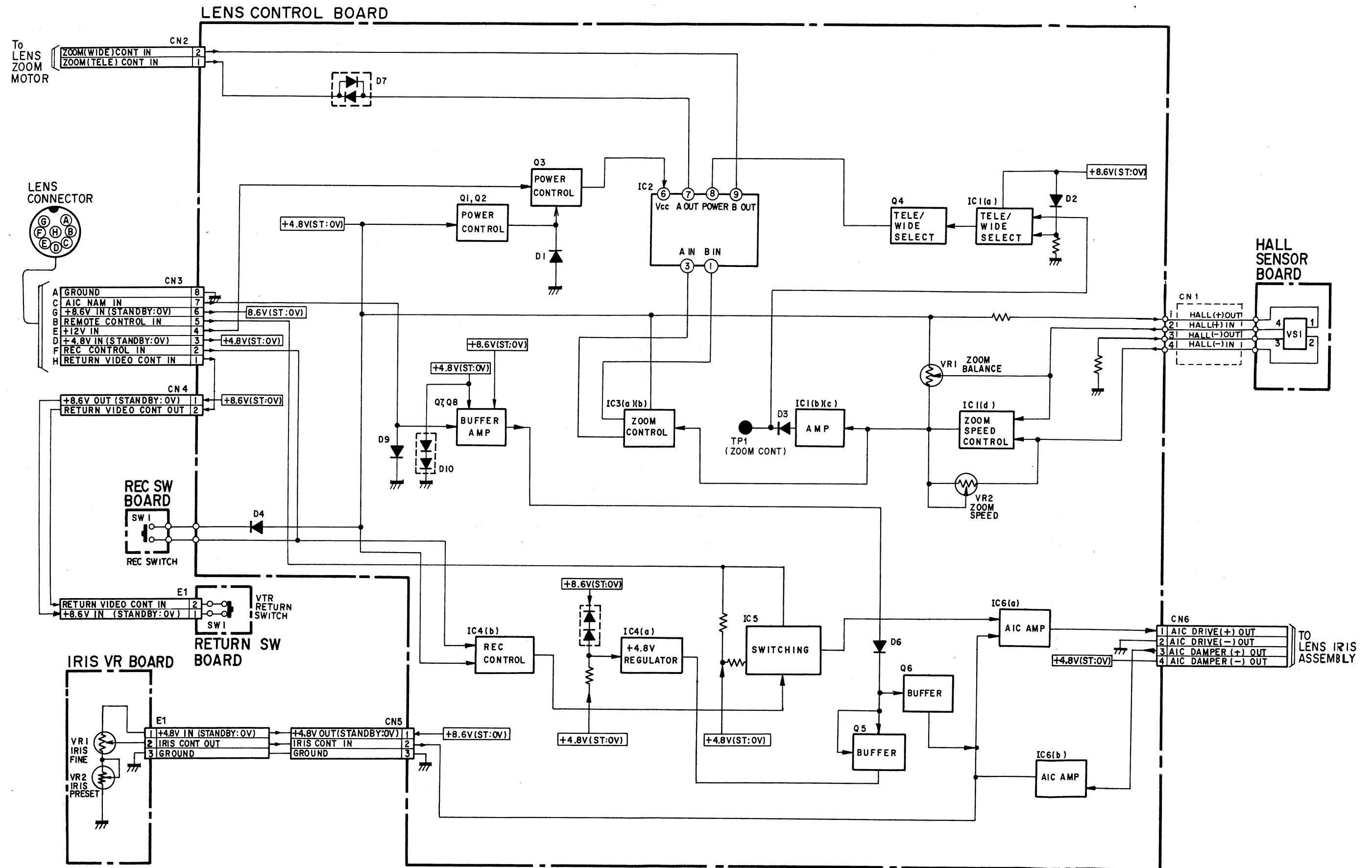


AUTO (A), (B) AND (C) BOARD

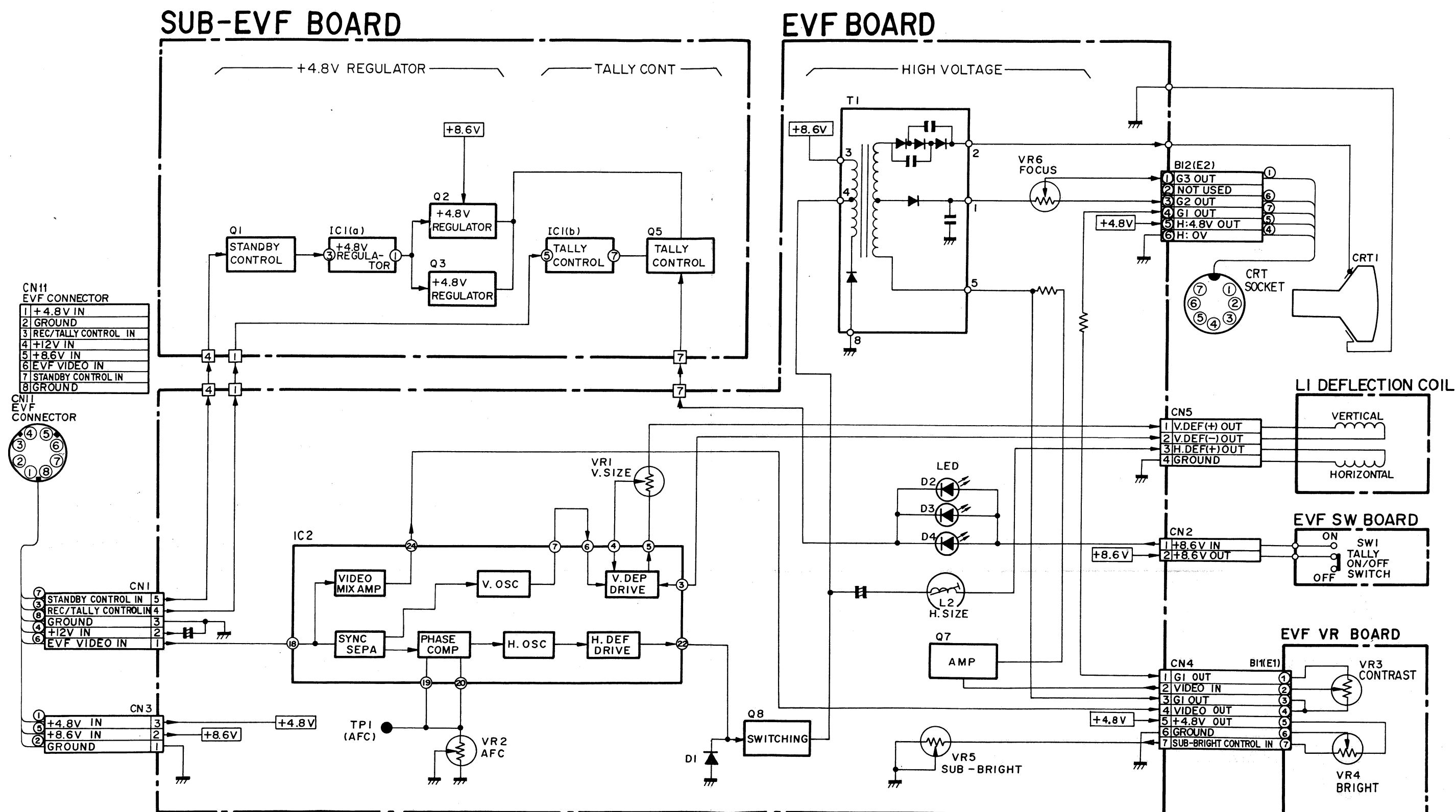
OARD



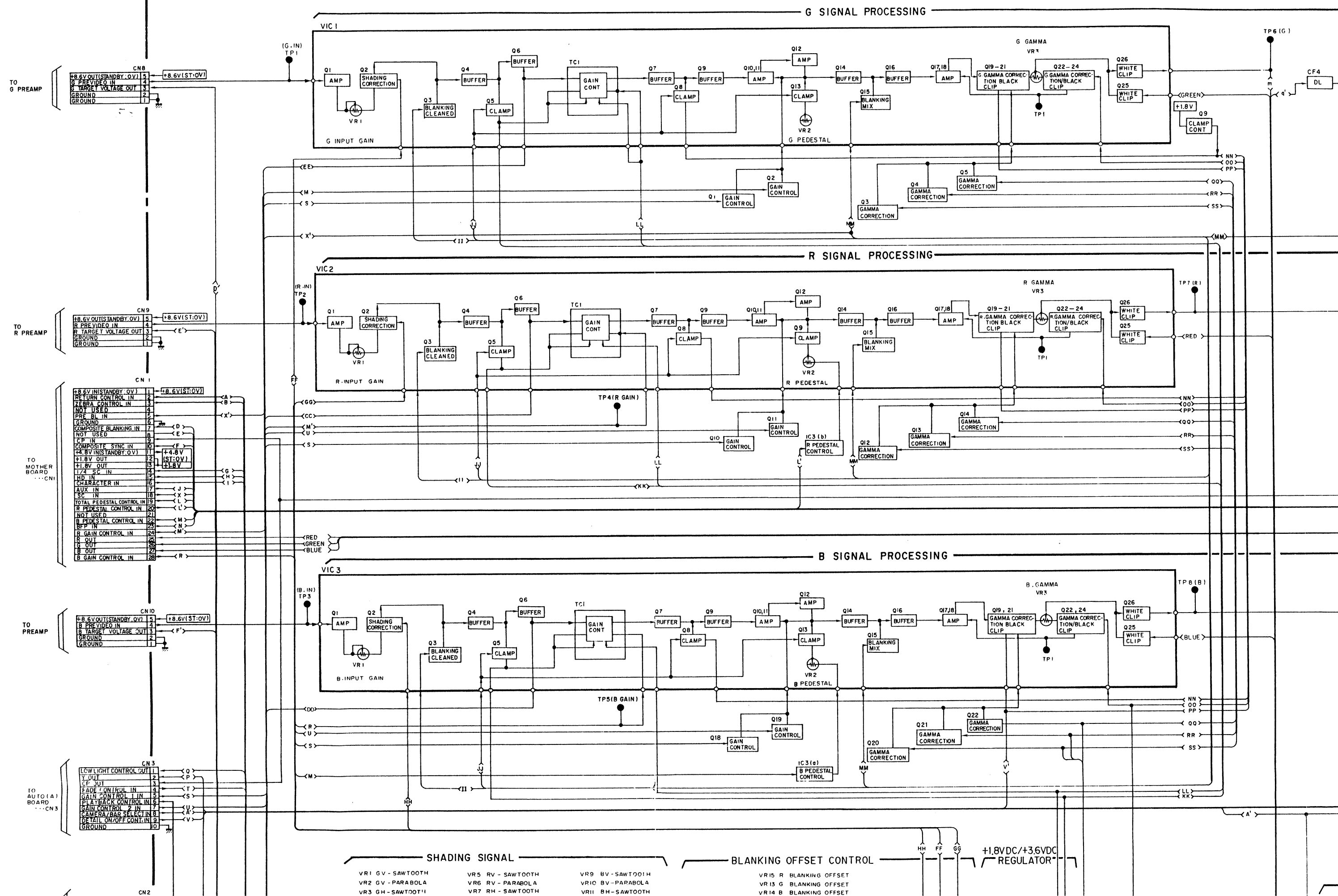
BLOCK DIAGRAM OF LENS CONTROL BOARD

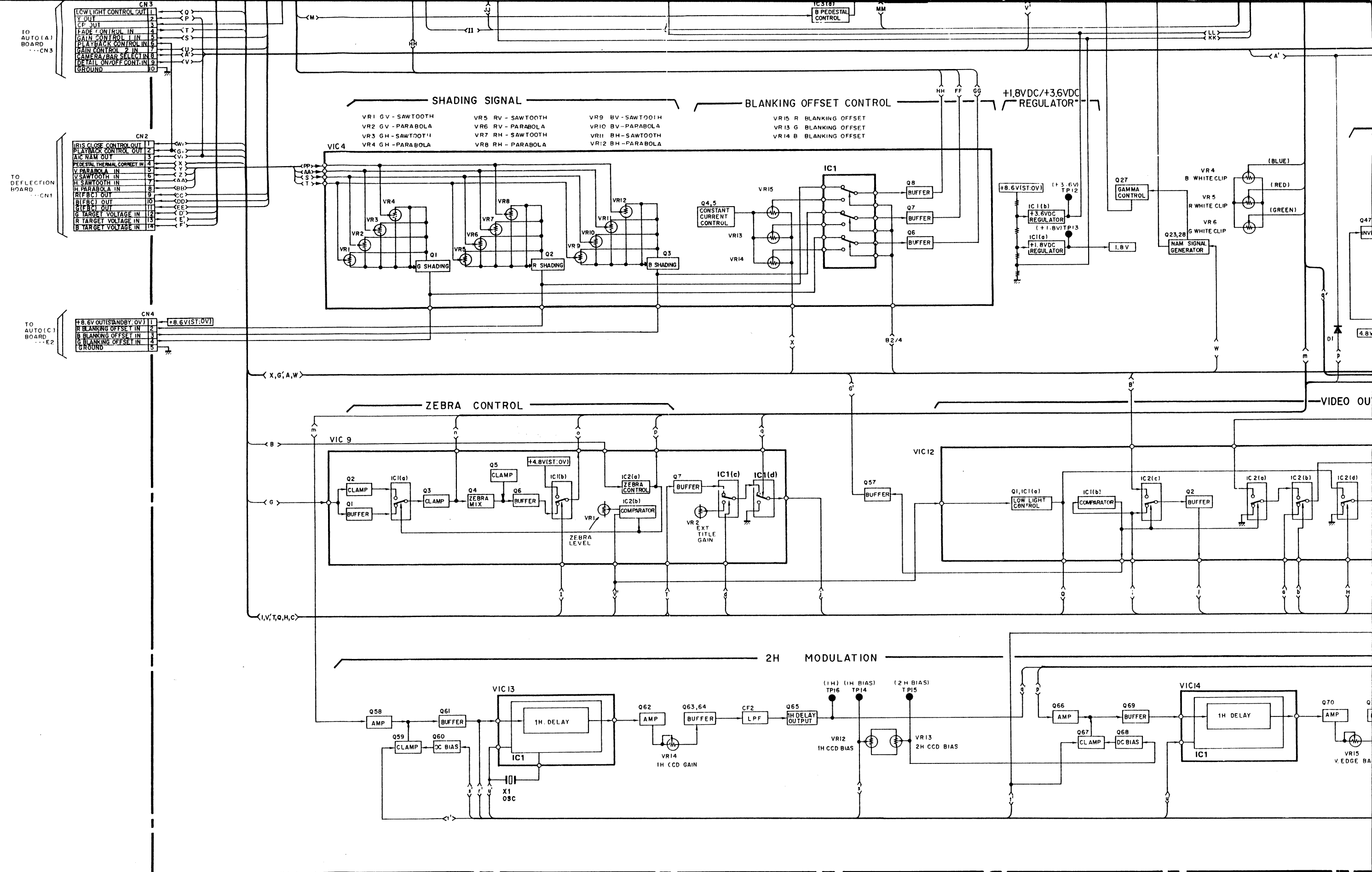


BLOCK DIAGRAM OF EVF WV-VF33

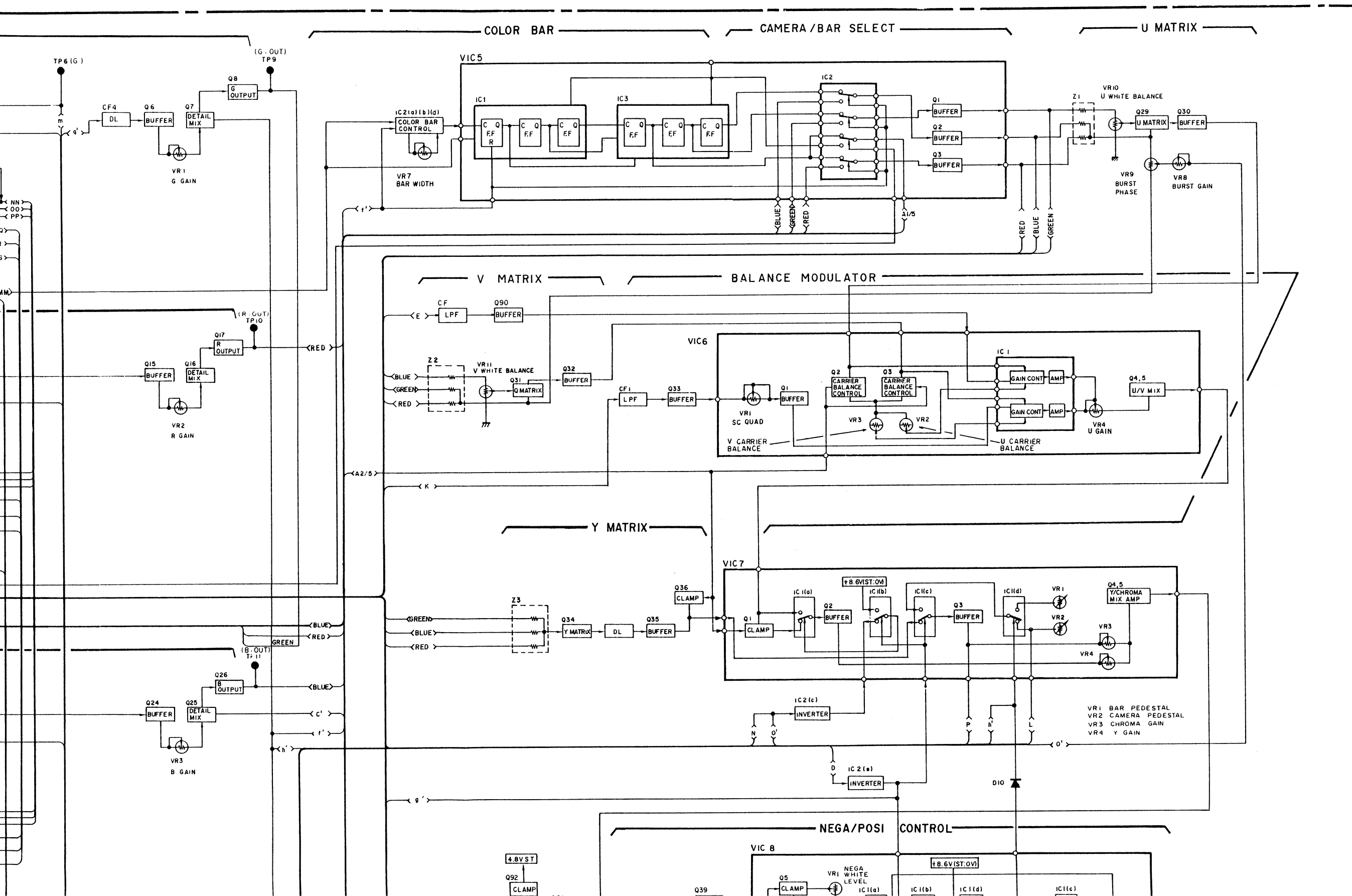


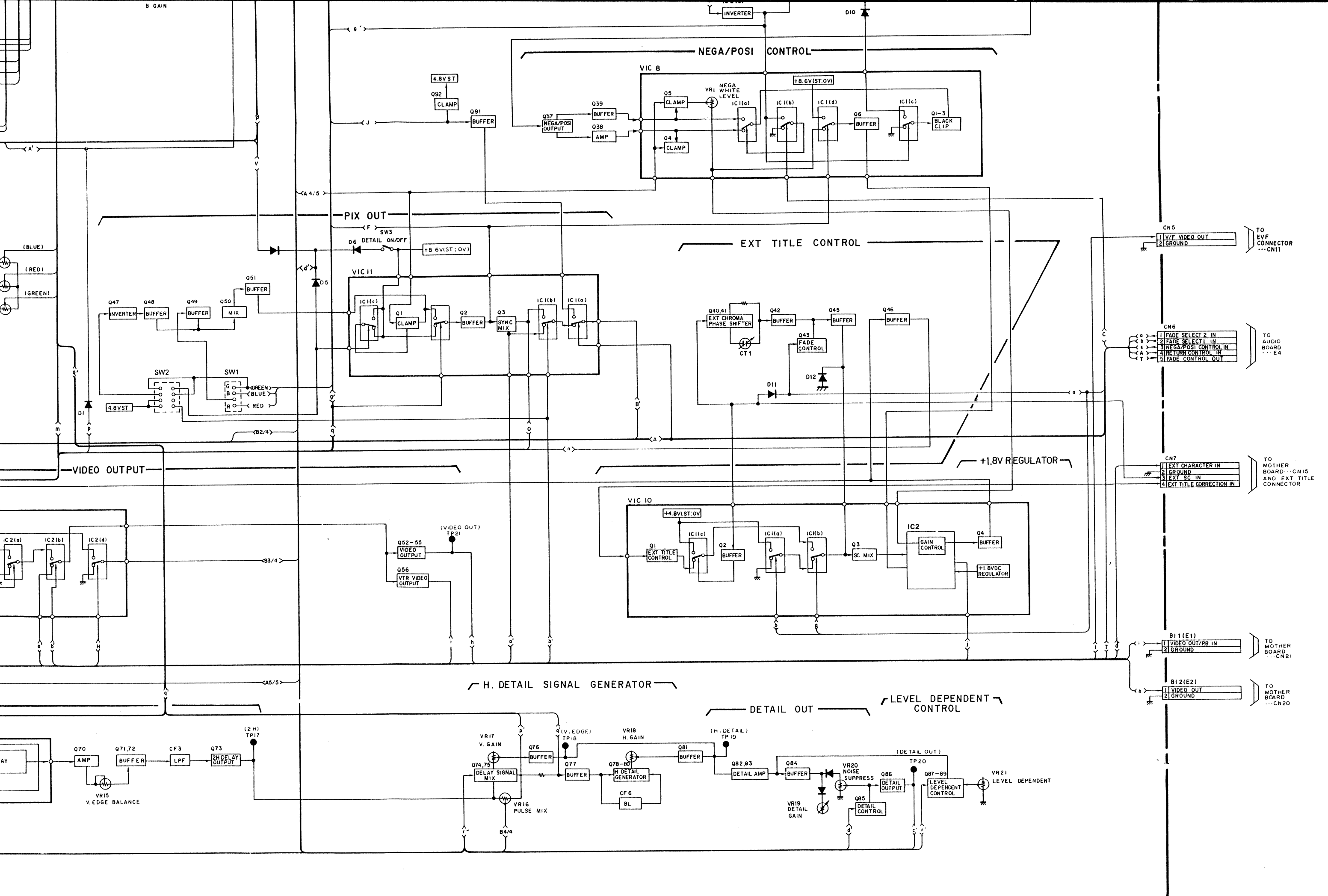
PROCESS BOARD





GRAM OF PROCESS BOARD





SCHEMATIC DIAGRAM OF PROCE

Process Board

Process VIC3 Board

IC1	NJM3414M	C5
IC2	NJU4572UBM	H8, E9, E10
IC3	NJM2904M	E4, F4
Q1	2SC2412K7QRS (BR)	G4
Q2	2SC2412K7QRS (BR)	G4
Q3	2SA1037K7QRS (FR)	B5
Q4	2SA1037K7QRS (FR)	G5
Q5	2SA1037K7QRS (FR)	G5
Q6	2SC2412K7QRS (BR)	H7
Q7	2SC2412K7QRS (BR)	H7
Q8	2SC2412K7QRS (BR)	H7
Q9	2SA1034-ST (F)	H6
Q10	2SC2412K7QRS (BR)	F4
Q11	2SC2412K7QRS (BR)	F4
Q12	2SA1037K7QRS (FR)	F5
Q13	2SA1037K7QRS (FR)	F5
Q14	2SA1037K7QRS (FR)	F5
Q15	2SC2412K7QRS (BR)	G7
Q16	2SC2412K7QRS (BR)	F7
Q17	2SC2412K7QRS (BR)	G7
Q18	2SC2412K7QRS (BR)	D4
Q19	2SC2412K7QRS (BR)	E4
Q20	2SA1037K7QRS (FR)	D5
Q21	2SA1037K7QRS (FR)	D5
Q22	2SA1037K7QRS (FR)	D5
Q23	2SA1037K7QRS (FR)	E5
Q24	2SC2412K7QRS (BR)	E7
Q25	2SC2412K7QRS (BR)	E7
Q26	2SC2412K7QRS (BR)	E7
Q27	2SC2412K7QRS (BR)	D6
Q28	2SC2412K7QRS (BR)	C6
Q29	2SC2412K7QRS (BR)	H11
Q30	2SC2405STU (S)	H11
Q31	2SC2412K7QRS (BR)	F8
Q32	2SC2405STU (S)	G8
Q33	2SC2412K7QRS (BR)	G9
Q34	2SA1037K7QRS (FR)	E8
Q35	2SC2405STU (S)	F9
Q36	2SC2404-CD (U)	F9
Q37	2SC2412K7QRS (BR)	D9
Q38	2SA1037K7QRS (FR)	D9
Q39	2SC2412K7QRS (BR)	D9
Q40	2SA1022-BC (E)	C9
Q41	2SA1022-BC (E)	C10
Q42	2SC2404-CD (U)	C10
Q43	2SC2404-CD (U)	C10
Q44	2SC2404-CD (U)	C10
Q45	2SA1022-BC (E)	C10
Q46	2SC2412K7QRS (BR)	C10
Q47	2SC2404-CD (U)	C7
Q48	2SC2404-CD (U)	C7
Q49	2SC2404-CD (U)	C7
Q50	2SC2404-CD (U)	C7
Q51	2SC2404-CD (U)	C7
Q52	2SC2412K7QRS (BR)	B8
Q53	2SA1037K7QRS (FR)	B8
Q54	2SD602-QRS (W)	B8
Q55	2SB710-QRS (C)	B8
Q56	2SD602-QRS (W)	B8
Q57	2SC2412K7QRS (BR)	B4
Q58	2SC2412K7QRS (BR)	A2
Q59	2SC641K-C	A2
Q60	2SC2405STU (S)	A2
Q61	2SA1034-ST (F)	A2
Q62	2SC2404-CD (U)	A4
Q63	2SC2404-CD (U)	A4
Q64	2SA1037K7QRS (FR)	A4
Q65	2SC2412K7QRS (BR)	A4
Q66	2SC2412K7QRS (BR)	A5
Q67	2SC641K-C	A6
Q68	2SC2405STU (S)	A6
Q69	2SA1034-ST (F)	A6
Q70	2SC2404-CD (U)	A7
Q71	2SC2404-CD (U)	A7
Q72	2SA1037K7QRS (FR)	A7
Q73	2SC2412K7QRS (BR)	A7
Q74	2SC2412K7QRS (BR)	A8
Q75	2SC2412K7QRS (BR)	A8
Q76	2SC2412K7QRS (BR)	A9
Q77	2SC2412K7QRS (BR)	A9
Q78	2SC2404-CD (U)	A9
Q79	2SC2404-CD (U)	A9
Q80	2SC2412K7QRS (BR)	A9
Q81	2SC2412K7QRS (BR)	A9
Q82	2SC2412K7QRS (BR)	A10
Q83	2SA1037K7QRS (FR)	A10
Q84	2SC2412K7QRS (BR)	A10
Q85	2SC2412K7QRS (BR)	A11
Q86	2SC2412K7QRS (BR)	A11
Q87	2SC2412K7QRS (BR)	A11
Q88	2SC2412K7QRS (BR)	A11
Q89	2SK128	A11
Q91	2SC2412K7QRS (BR)	D8
Q92	2SC2412K7QRS (BR)	D8
D1	MA151A (MA)	C6

IC1	NJU4053BM	C4
Q1	2SA1037K7QRS (FR)	C2
Q2	2SA1037K7QRS (FR)	C3
Q3	2SA1037K7QRS (FR)	C3
Q4	2SC2412K7QRS (BR)	D4
Q5	2SA1037K7QRS (FR)	C4
Q6	2SC2412K7QRS (BR)	C5
Q7	2SC2412K7QRS (BR)	C5
Q8	2SC2412K7QRS (BR)	C5

Process VIC5 Board

IC1	NJU4516BM	H9
IC2	SC49069	H9, H10
Q1	2SC2412K7QRS (BR)	H10
Q2	2SC2412K7QRS (BR)	H10
Q3	2SC2412K7QRS (BR)	H10
D1	MA151K (MH)	H8
D2	MA151K (MH)	H10
D3	MA151K (MH)	H10
D4	MA151K (MH)	H10

Process VIC6 Board

IC1	AN2020S	F10, G10
Q1	2SC2412K7QRS (BR)	G9
Q2	2SC2404-CD (U)	G9
Q3	2SC2404-CD (U)	G10
Q4	2SC2412K7QRS (BR)	F11
Q5	2SC2405STU (S)	G11

Process VIC7 Board

IC1	SC49069	E9, E10, F9, F10
Q1	2SC2404-CD (U)	E9
Q2	2SC2405STU (S)	F9
Q3	2SC2405STU (S)	F10
Q4	2SC2412K7QRS (BR)	F11
Q5	2SA1037K7QRS (FR)	F11

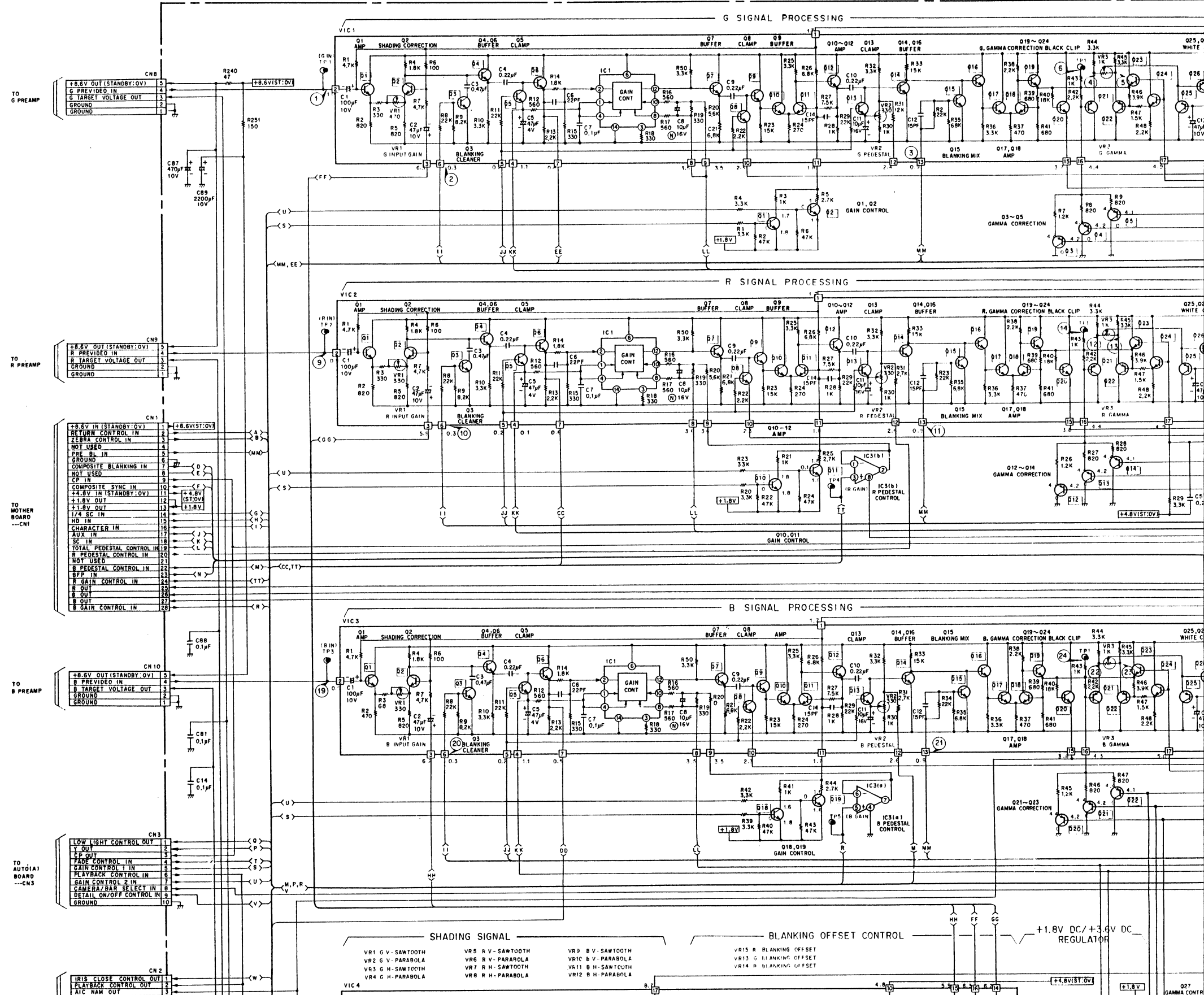
Process VIC8 Board

IC1	SC49069	D10
Q1	2SC2405STU (S)	D10
Q2	2SC2405STU (S)	D11
Q3	2SA1034-ST (F)	D11
Q4	2SC2404-CD (U)	D9
Q5	2SC2404-CD (U)	D9
Q6	2SC2405STU (S)	D10

Process VIC9 Board

IC1	SC49069	B2, B3, B4
IC2	NJM2903M	B3
Q1	2SC2412K7QRS (BR)	B2
Q2	2SC2412K7QRS (BR)	B2

PROCESS BOARD



Q84	2SA1037K7QRS (FR)	A10
Q85	2SC2412K7QRS (BR)	A10
Q86	2SC2412K7QRS (BR)	A11
Q87	2SC2412K7QRS (BR)	A11
Q88	2SC2412K7QRS (BR)	A11
Q89	2SK128	A11
Q91	2SC2412K7QRS (BR)	D8
Q92	2SC2412K7QRS (BR)	D8
D1	MA151A (MA)	C6
D2	MA151K (MH)	B8
D3	MA151K (MH)	B8
D4	MA151K (MH)	B2
D5	MA151K (MH)	C7
D6	MA151K (MH)	D8
D7	MA151K (MH)	D7
D8	1S1925	A10
D9	1S1925	A10
D10	MA151K (MH)	E10
D11	MA151WK (MT)	C11
D12	MA157	C10

Process VIC1 Board

IC1	YFNJM1496M	H3
Q1	2SC2404-CD (U)	H2
Q2	2SC2404-CD (U)	H2
Q3	2SC2404-CD (U)	H3
Q4	2SC2405STU (S)	H3
Q5	2SC2404-CD (U)	H3
Q6	2SC2405STU (S)	H3
Q7	2SC2404-CD (U)	H4
Q8	2SC2404-CD (U)	H4
Q9	2SC2405STU (S)	H4
Q10	2SC2404-CD (U)	H4
Q11	2SC2404-CD (U)	H4
Q12	2SC2404-CD (U)	H4
Q13	2SC2404-CD (U)	H4
Q14	2SA1034-ST (F)	H4
Q15	2SC2404-CD (U)	H5
Q16	2SC2412K7QRS (BR)	H5
Q17	2SC2412K7QRS (BR)	H5
Q18	2SC2412K7QRS (BR)	H5
Q19	2SC2412K7QRS (BR)	H5
Q20	2SC2412K7QRS (BR)	H5
Q21	2SA1037K7QRS (FR)	H5
Q22	2SA1037K7QRS (FR)	H5
Q23	2SC2412K7QRS (BR)	H5
Q24	2SC2412K7QRS (BR)	H6
Q25	2SA1037K7QRS (FR)	H6
Q26	2SA1037K7QRS (FR)	H6

Process VIC2 Board

IC1	YFNJM1496M	F3, G3
Q1	2SC2404-CD (U)	G2
Q2	2SC2404-CD (U)	G2
Q3	2SC2404-CD (U)	F3
Q4	2SC2405STU (S)	G3
Q5	2SC2404-CD (U)	G3
Q6	2SC2405STU (S)	G3
Q7	2SC2404-CD (U)	G4
Q8	2SC2404-CD (U)	F4
Q9	2SC2405STU (S)	G4
Q10	2SC2404-CD (U)	F4
Q11	2SC2404-CD (U)	F4
Q12	2SC2404-CD (U)	G4
Q13	2SC2404-CD (U)	F4
Q14	2SA1034-ST (F)	G4
Q15	2SC2404-CD (U)	F5
Q16	2SC2412K7QRS (BR)	G5
Q17	2SC2412K7QRS (BR)	F5
Q18	2SC2412K7QRS (BR)	F5
Q19	2SC2412K7QRS (BR)	G5
Q20	2SC2412K7QRS (BR)	F5
Q21	2SA1037K7QRS (FR)	F5
Q22	2SA1037K7QRS (FR)	F5
Q23	2SC2412K7QRS (BR)	G5
Q24	2SC2412K7QRS (BR)	F6
Q25	2SA1037K7QRS (FR)	F6
Q26	2SA1037K7QRS (FR)	G6

Q5	2SC2404-CD (U)	D9
Q6	2SC2405STU (S)	D10

Process VIC9 Board

IC1	SC49069	B2, B3, B4
IC2	NJM2903M	B3
Q1	2SC2412K7QRS (BR)	B2
Q2	2SC2412K7QRS (BR)	B2
Q3	2SC2412K7QRS (BR)	B2
Q4	2SC2412K7QRS (BR)	B3
Q5	2SC2412K7QRS (BR)	B3
Q6	2SC2412K7QRS (BR)	B3
Q7	2SC2412K7QRS (BR)	B4

Process VIC10 Board

IC1	NJU4053BM	B9, B10
IC2	YFNJM1496M	B10
IC3	NJM3415M	B11
Q1	2SC2412K7QRS (BR)	B9
Q2	2SC2412K7QRS (BR)	B10
Q3	2SC2412K7QRS (BR)	B10
Q4	2SC2404-CD (U)	B11

Process VIC11 Board

IC1	SC49069	C8, C9
Q1	2SC2404-CD (U)	C8
Q2	2SC2412K7QRS (BR)	C8
Q3	2SC2412K7QRS (BR)	C8

Process VIC12 Board

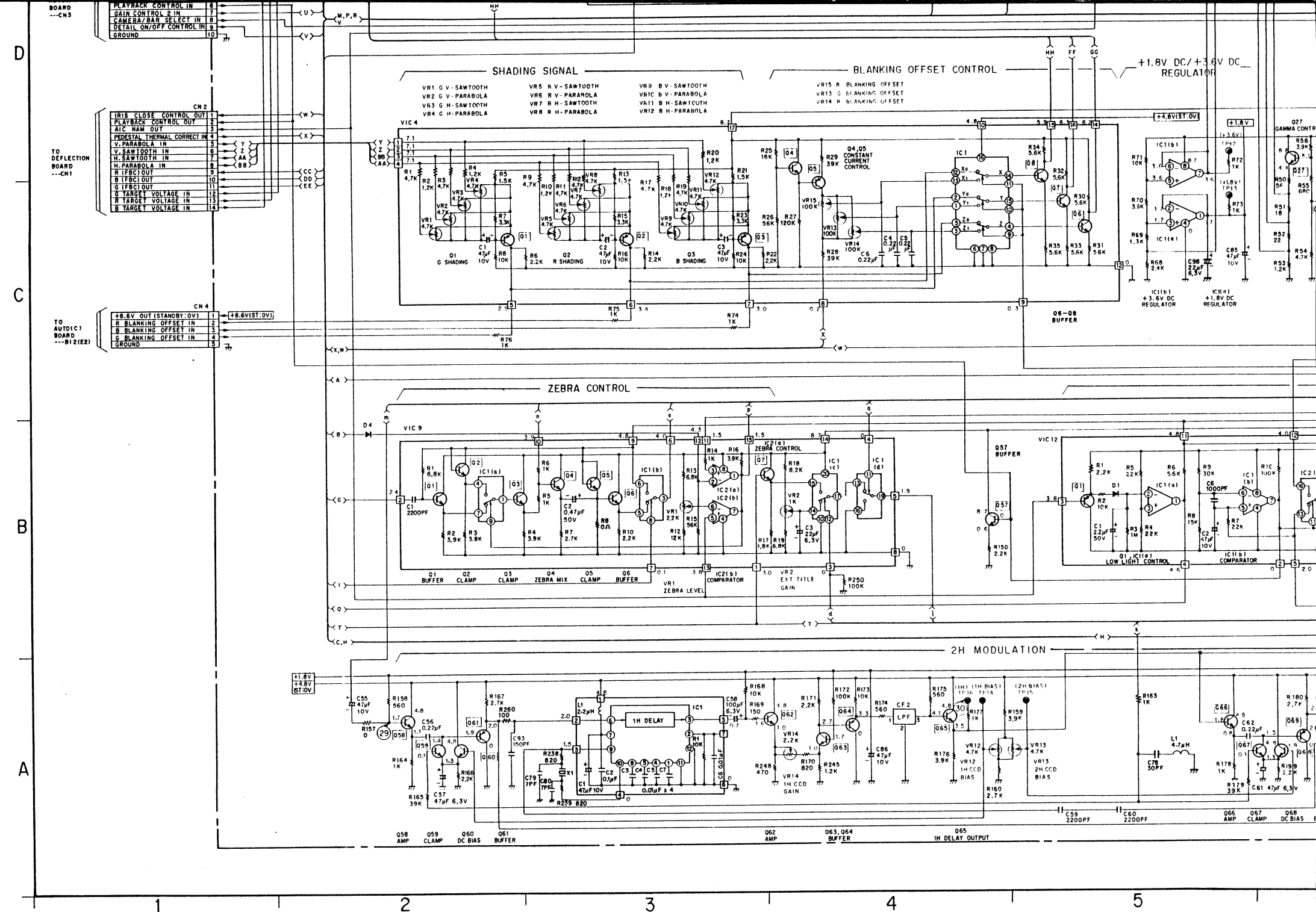
IC1	NJM2903M	B5, B6
IC2	SC49069	B6
Q1	2SA1037K7QRS (FR)	B5
Q2	2SC2412K7QRS (BR)	B6
D1	MA151K (MH)	B5
D2	MA151K (MH)	B7

Process VIC13 Board

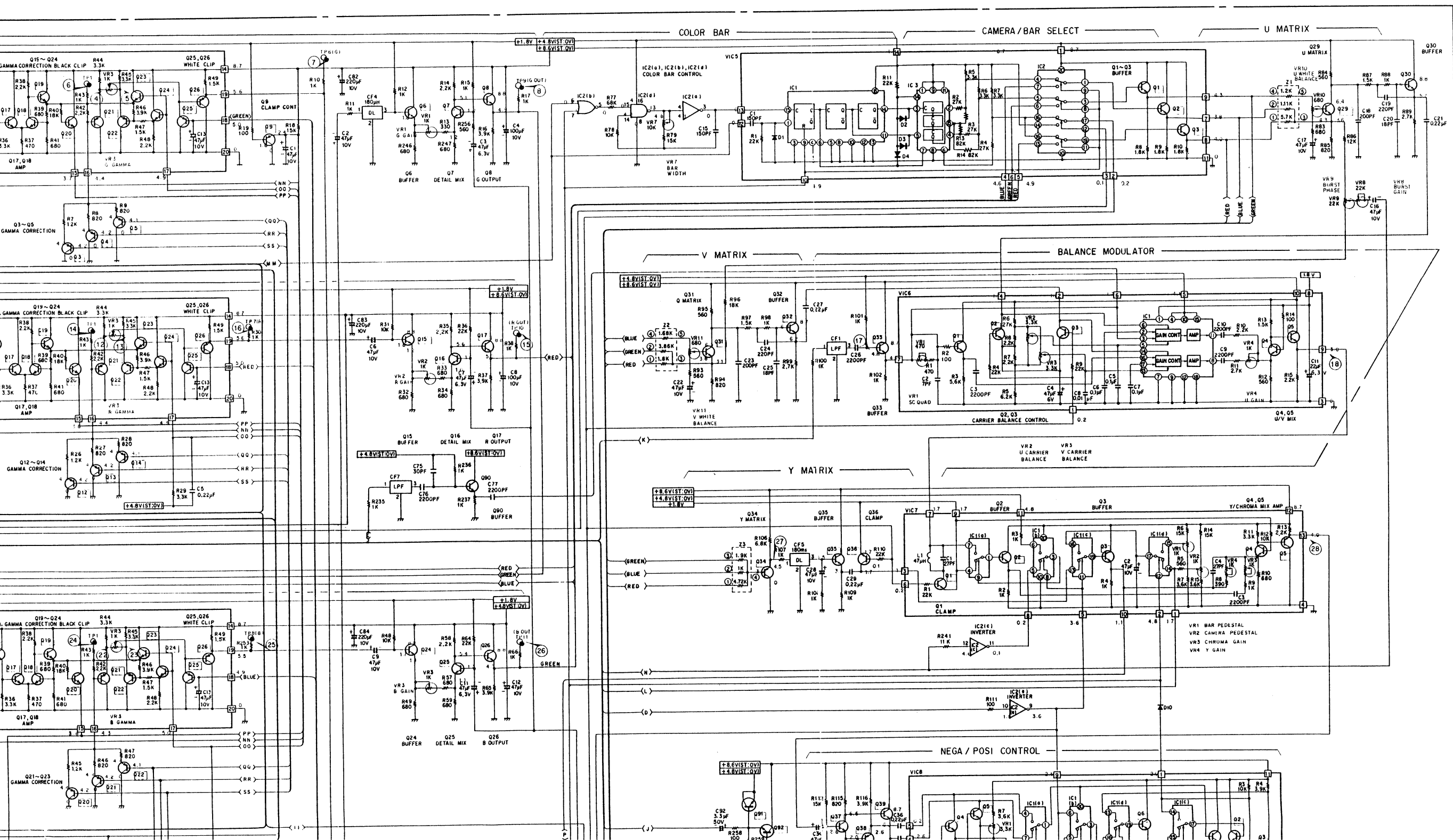
IC1	MN3801	A3
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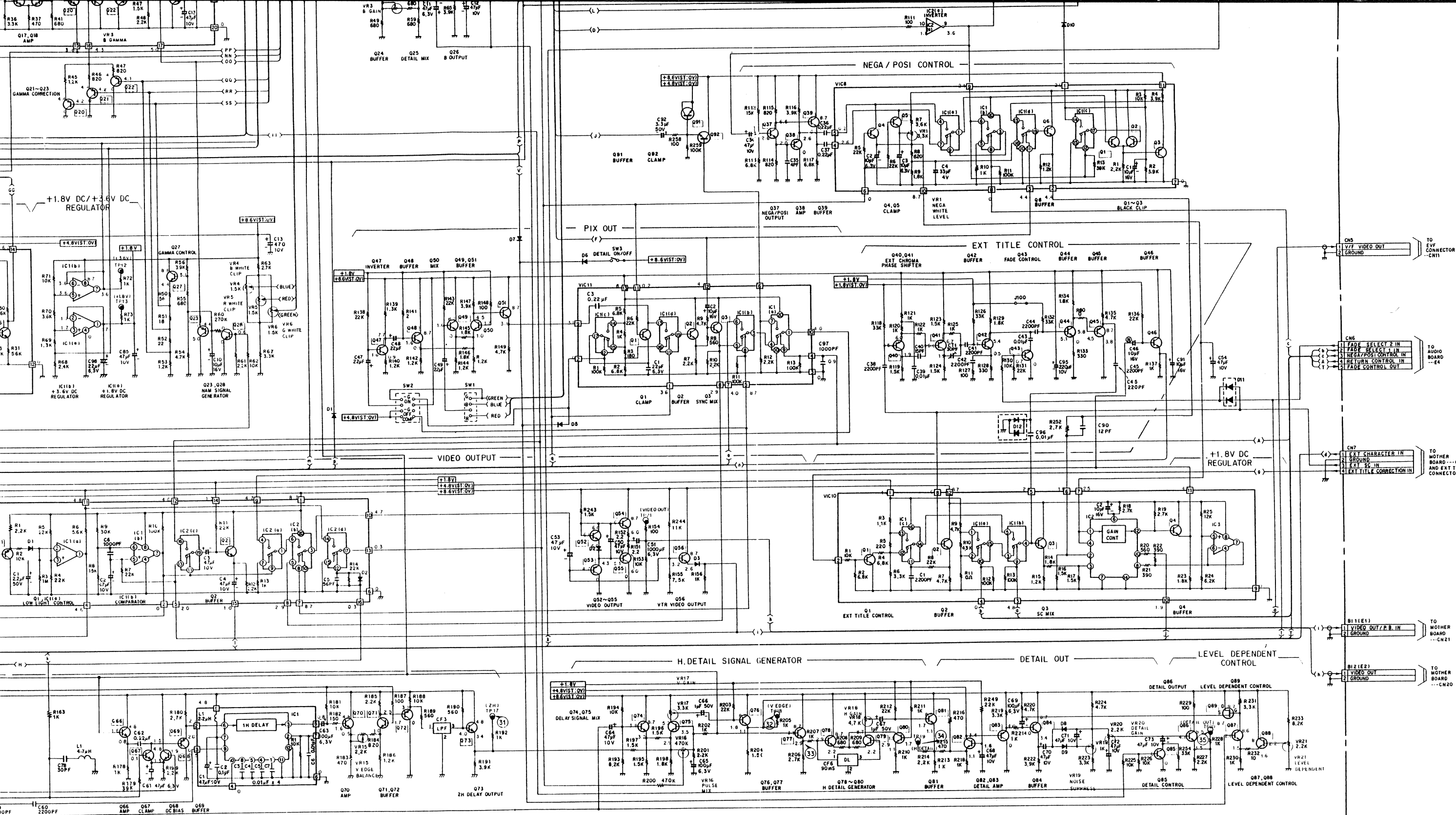
Process VIC14 Board

IC1	MN3801	A6
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M OF PROCESS BOARD





5

6

7

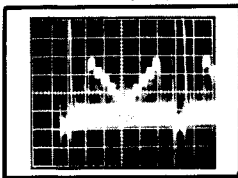
8

9

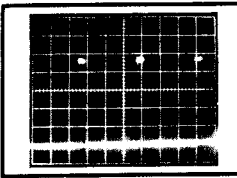
10

11

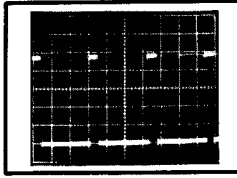
1 50mV/DIV, 10μs/DIV



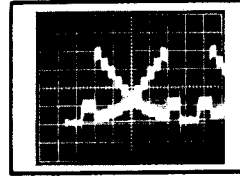
2 1V/DIV, 20μs/DIV



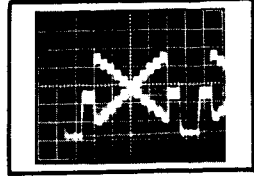
3 1V/DIV, 20μs/DIV



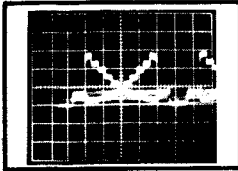
4 0.1V/DIV, 10μs/DIV



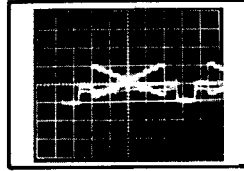
5 0.1V/DIV, 10μs/DIV



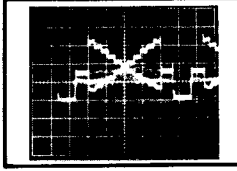
6 0.5V/DIV, 10μs/DIV



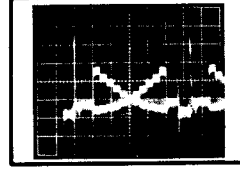
7 0.2V/DIV, 10μs/DIV



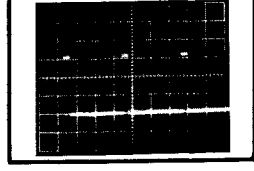
8 0.2V/DIV, 10μs/DIV



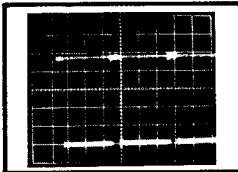
9 50mV/DIV, 10μs/DIV



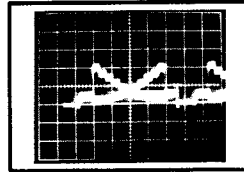
10 1V/DIV, 20μs/DIV



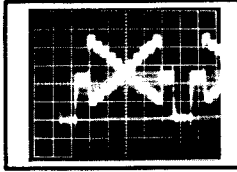
11 1V/DIV, 20μs/DIV



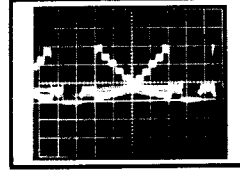
12 0.2V/DIV, 10μs/DIV



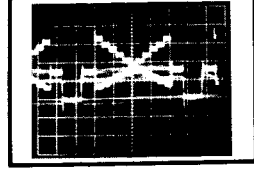
13 0.1V/DIV, 10μs/DIV



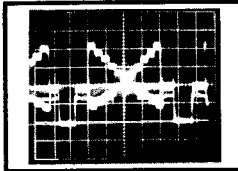
14 0.5V/DIV, 10μs/DIV



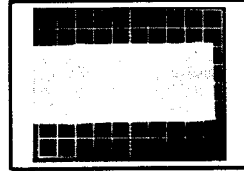
15 0.2V/DIV, 10μs/DIV



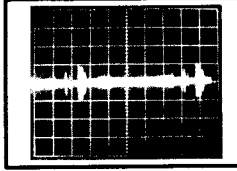
16 0.1V/DIV, 10μs/DIV



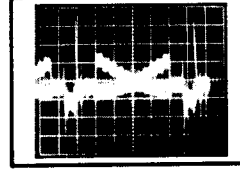
17 50mV/DIV, 10μs/DIV



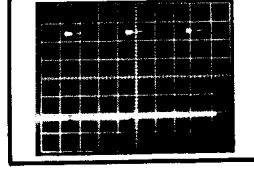
18 0.2V/DIV, 10μs/DIV



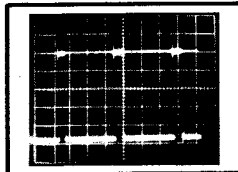
19 20mV/DIV, 10μs/DIV



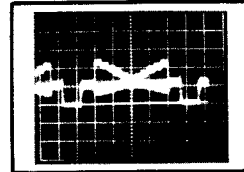
20 1V/DIV, 20μs/DIV



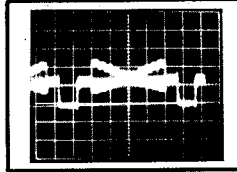
21 1V/DIV, 20μs/DIV



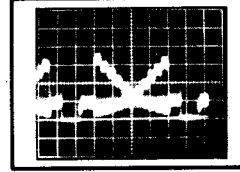
22 0.2V/DIV, 10μs/DIV



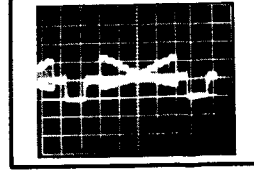
23 0.2V/DIV, 10μs/DIV



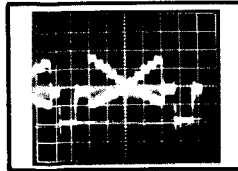
24 0.5V/DIV, 10μs/DIV



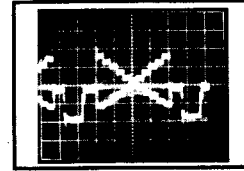
25 0.2V/DIV, 10μs/DIV



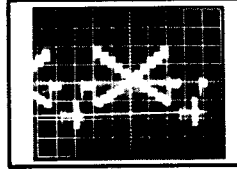
26 0.2V/DIV, 10μs/DIV



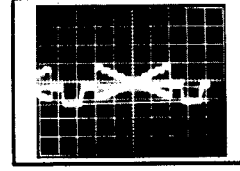
27 0.2V/DIV, 10μs/DIV



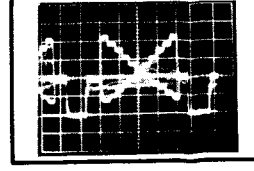
28 0.5V/DIV, 10μs/DIV



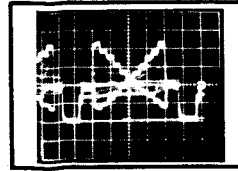
29 0.2V/DIV, 10μs/DIV



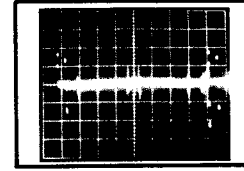
30 0.1V/DIV, 10μs/DIV



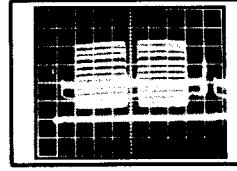
31 0.1V/DIV, 10μs/DIV



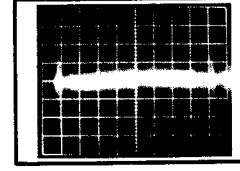
32 50mV/DIV, 10μs/DIV



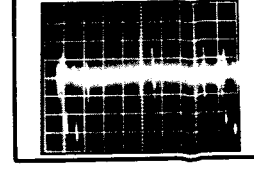
33 0.1V/DIV, 2ms/DIV



34 20mV/DIV, 2ms/DIV

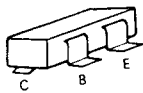


35 20mV/DIV, 2ms/DIV

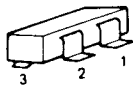


Process Board

2SA1037K7QRS
2SC2412K7QRS
2SC2405STU
2SC2404-CD
2SD602-QRS
2SB710-QRS
2SA1022-BC
2SA1034-ST

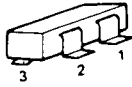


MA151A



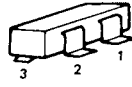
1 : NC
2 : Cathode
3 : Anode

MA151K



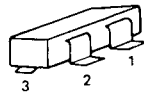
1 : NC
2 : Anode
3 : Cathode

MA151WK



1 : Anode
2 : Anode
3 : Cathode

MA157

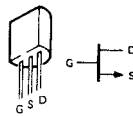


1 : Cathode
2 : Anode
3 : Cathode/
Anode

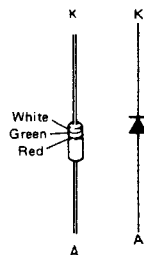
2SC641K-C



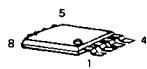
2SK128



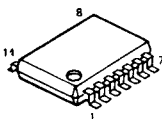
IS1925



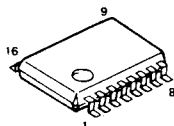
NJM3415M
NJM3414M
NJM2904M
NJM2903M



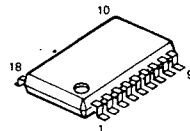
MN3801
NJM1496M



NJU4572UBM
NJU4053BM
NJU4516BM



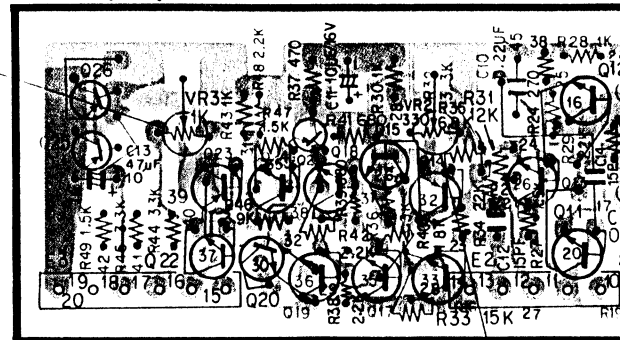
AN2020S



CONDUCTOR VIEW OF PR

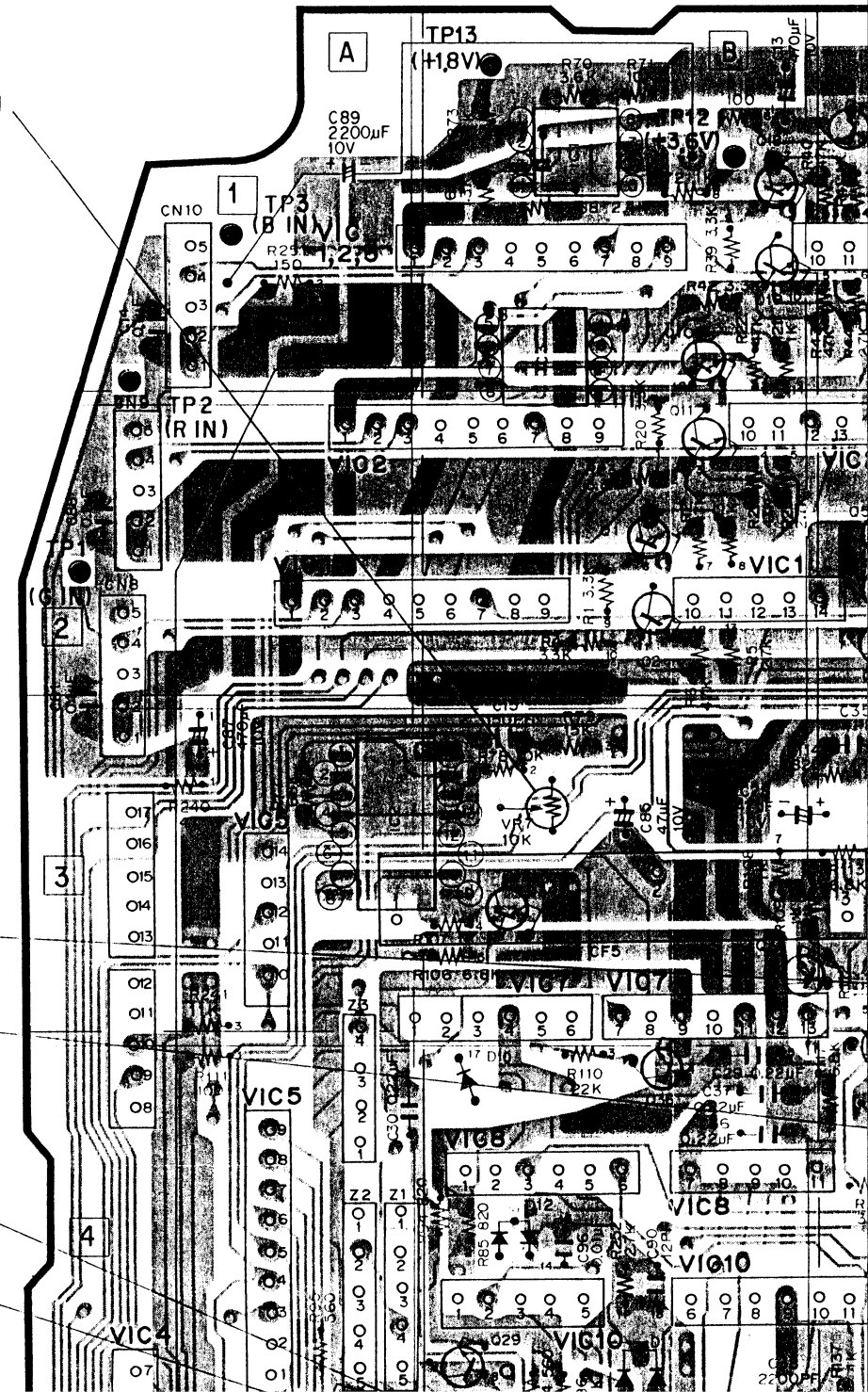
VIC1,2,3 BOARD

VR3
GAMMA
VIC1:G
VIC2:R
VIC3:B



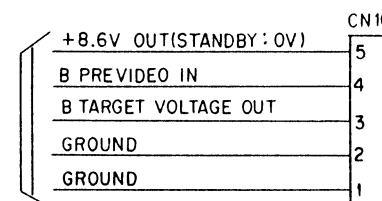
VR2
PEDESTAL
VIC1:G
VIC2:R
VIC3:B

PROCESS BOARD

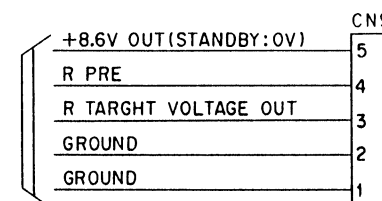


VR7
BAR WIDTH

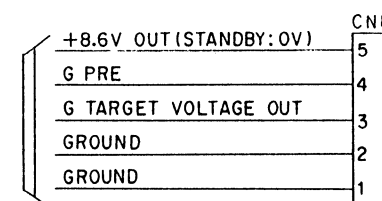
TO
B PREAMP



TO
R PREAMP



TO
G PREAMP



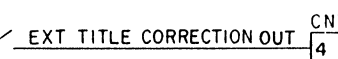
VR14
1H CCD GAIN

VR15
V. EDGE BALANCE

VR10
U WHITE BALANCE

VR11
V WHITE BALANCE

TO
MOTHER BOARD



Process Board

IC1	NJM3414M	E3
IC2	NJU4572UBM	D3
IC3	NJM2904M	E3
Q1	2SC2412K7QRS (BR)	E3
Q2	2SC2412K7QRS (BR)	E2
Q3	2SA1037K7QRS (FR)	E4
Q4	2SA1037K7QRS (FR)	E4
Q5	2SA1037K7QRS (FR)	E4
Q6	2SC2412K7QRS (BR)	D5, D6
Q7	2SC2412K7QRS (BR)	D5, D6
Q8	2SC2412K7QRS (BR)	D5
Q9	2SA1034-ST (F)	E4
Q10	2SC2412K7QRS (BR)	E3
Q11	2SC2412K7QRS (BR)	E3
Q12	2SA1037K7QRS (FR)	E4
Q13	2SA1037K7QRS (FR)	E4
Q14	2SA1037K7QRS (FR)	E4
Q15	2SC2412K7QRS (BR)	E5
Q16	2SC2412K7QRS (BR)	D5
Q17	2SC2412K7QRS (BR)	D5
Q18	2SC2412K7QRS (BR)	E3
Q19	2SC2412K7QRS (BR)	E3
Q20	2SA1037K7QRS (FR)	E4
Q21	2SA1037K7QRS (FR)	E4
Q22	2SA1037K7QRS (FR)	E4
Q23	2SA1037K7QRS (FR)	E4
Q24	2SC2412K7QRS (BR)	E5
Q25	2SC2412K7QRS (BR)	E5
Q26	2SC2412K7QRS (BR)	E5
Q27	2SC2412K7QRS (BR)	E4, F4
Q28	2SC2412K7QRS (BR)	E4
Q29	2SC2412K7QRS (BR)	C3
Q30	2SC2405STU (S)	C3
Q31	2SC2412K7QRS (BR)	C3
Q32	2SC2405STU (S)	C3
Q33	2SC2412K7QRS (BR)	B3, C3
Q34	2SA1037K7QRS (FR)	D3
Q35	2SC2405STU (S)	D3, D4
Q36	2SC2404-CD (U)	D3
Q37	2SC2412K7QRS (BR)	D4
Q38	2SA1037K7QRS (FR)	D4
Q39	2SC2412K7QRS (BR)	D4
Q40	2SA1022-BC (E)	C4
Q41	2SA1022-BC (E)	C4
Q42	2SC2404-CD (U)	C4
Q43	2SC2404-CD (U)	C4
Q44	2SC2404-CD (U)	C4
Q45	2SA1022-BC (E)	C4
Q46	2SC2412K7QRS (BR)	C4
Q47	2SC2404-CD (U)	B4, C4
Q48	2SC2404-CD (U)	C4
Q49	2SC2404-CD (U)	C4
Q50	2SC2404-CD (U)	B4, C4
Q51	2SC2404-CD (U)	C4
Q52	2SC2412K7QRS (BR)	B5
Q53	2SA1037K7QRS (FR)	B5
Q54	2SD602-QRS (W)	B5
Q55	2SB710-QRS (C)	B5
Q56	2SD602-QRS (W)	B5
Q57	2SC2412K7QRS (BR)	B4
Q58	2SC2412K7QRS (BR)	D4, E4
Q59	2SC641K-C	D5
Q60	2SC2405STU (S)	D5
Q61	2SA1034-ST (F)	D4
Q62	2SC2404-CD (U)	D4
Q63	2SC2404-CD (U)	D4
Q64	2SA1037K7QRS (FR)	D4
Q65	2SC2412K7QRS (BR)	D5
Q66	2SC2412K7QRS (BR)	D5
Q67	2SC641K-C	D5
Q68	2SC2405STU (S)	C5, D5
Q69	2SA1034-ST (F)	D5
Q70	2SC2404-CD (U)	D4
Q71	2SC2404-CD (U)	D4
Q72	2SA1037K7QRS (FR)	D4
Q73	2SC2412K7QRS (BR)	C5
Q74	2SC2412K7QRS (BR)	D6
Q75	2SC2412K7QRS (BR)	C5, C6
Q76	2SC2412K7QRS (BR)	C5
Q77	2SC2412K7QRS (BR)	C5
Q78	2SC2404-CD (U)	C5
Q79	2SC2404-CD (U)	B5, C5
Q80	2SC2412K7QRS (BR)	C5
Q81	2SC2412K7QRS (BR)	C6
Q82	2SC2412K7QRS (BR)	C6
Q83	2SA1037K7QRS (FR)	B6, C6
Q84	2SC2412K7QRS (BR)	B6
Q85	2SC2412K7QRS (BR)	B6
Q86	2SC2412K7QRS (BR)	B6
Q87	2SC2412K7QRS (BR)	B5, C5
Q88	2SC2412K7QRS (BR)	B5, C5
Q89	2SK128	B5
Q91	2SC2412K7QRS (BR)	C4
Q92	2SC2412K7QRS (BR)	C5
Q93	MA151K (MH)	B5

Process VIC4 Board

IC1	NJU4053BM	F6, F7
Q1	2SA1037K7QRS (FR)	F7
Q2	2SA1037K7QRS (FR)	F7
Q3	2SA1037K7QRS (FR)	F6
Q4	2SC2412K7QRS (BR)	F6
Q5	2SA1037K7QRS (FR)	F6
Q6	2SC2412K7QRS (BR)	F6
Q7	2SC2412K7QRS (BR)	F6
Q8	2SC2412K7QRS (BR)	F6

Process VIC5 Board

IC1	NJU4516BM	F7
IC2	SC49069	F7
Q1	2SC2412K7QRS (BR)	F7
Q2	2SC2412K7QRS (BR)	F7
Q3	2SC2412K7QRS (BR)	F7
D1	MA151K (MH)	F7
D2	MA151K (MH)	F7
D3	MA151K (MH)	F7
D4	MA151K (MH)	F7

Process VIC6 Board

IC1	AN2020S	E7
Q1	2SC2412K7QRS (BR)	E7
Q2	2SC2404-CD (U)	D7
Q3	2SC2404-CD (U)	E7
Q4	2SC2412K7QRS (BR)	E7
Q5	2SC2405STU (S)	E7

Process VIC7 Board

IC1	SC49069	D7
Q1	2SC2404-CD (U)	D7
Q2	2SC2405STU (S)	D7
Q3	2SC2405STU (S)	D7
Q4	2SC2412K7QRS (BR)	D7
Q5	2SA1037K7QRS (FR)	D7

Process VIC8 Board

IC1	SC49069	C7
Q1	2SC2405STU (S)	C7
Q2	2SC2405STU (S)	C7
Q3	2SA1034-ST (F)	C7
Q4	2SC2404-CD (U)	C7
Q5	2SC2404-CD (U)	C7
Q6	2SC2405STU (S)	C7

Process VIC9 Board

IC1	SC49069	B7
IC2	NJM2903M	B7
Q1	2SC2412K7QRS (BR)	B7
Q2	2SC2412K7QRS (BR)	B7
Q3	2SC2412K7QRS (BR)	B7
Q4	2SC2412K7QRS (BR)	B7
Q5	2SC2412K7QRS (BR)	A7
Q6	2SC2412K7QRS (BR)	B7
Q7	2SC2412K7QRS (BR)	B7

Process VIC10 Board

IC1	NJU4053BM	B7
IC2	YFNJM1496M	B7
IC3	NJM3415M	B7, C7
Q1	2SC2412K7QRS (BR)	B7
Q2	2SC2412K7QRS (BR)	B7
Q3	2SC2412K7QRS (BR)	B7
Q4	2SC2404-CD (U)	B7

Process VIC11 Board

IC1	SC49069	A6
Q1	2SC2404-CD (U)	A6
Q2	2SC2412K7QRS (BR)	A6
Q3	2SC2412K7QRS (BR)	A5

Process VIC12 Board

IC1	NJM2903M	A7
IC2	SC49069	A7
Q1	2SA1037K7QRS (FR)	A7
Q2	2SC2412K7QRS (BR)	A7
D1	MA151K (MH)	A7

Process VIC11 Board				
Q78	2SC2404-CD	(U)	C5	
Q79	2SC2404-CD	(U)	B5, C5	
Q80	2SC2412K7QRS	(BR)	C5	IC1 SC49069 A6
Q81	2SC2412K7QRS	(BR)	C6	Q1 2SC2404-CD (U) A6
Q82	2SC2412K7QRS	(BR)	C6	Q2 2SC2412K7QRS (BR) A6
Q83	2SA1037K7QRS	(FR)	B6, C6	Q3 2SC2412K7QRS (BR) A5
Q84	2SC2412K7QRS	(BR)	B6	
Q85	2SC2412K7QRS	(BR)	B6	
Q86	2SC2412K7QRS	(BR)	B6	
Q87	2SC2412K7QRS	(BR)	B5, C5	
Q88	2SC2412K7QRS	(BR)	B5, C5	IC1 NJM2903M A7
Q89	2SK128	B5		IC2 SC49069 A7
Q91	2SC2412K7QRS	(BR)	C4	Q1 2SA1037K7QRS (FR) A7
Q92	2SC2412K7QRS	(BR)	C5	Q2 2SC2412K7QRS (BR) A7
D1	MA151A	(MA)	B5	D1 MA151K (MH) A7
D2	MA151K	(MH)	B5	D2 MA151K (MH) A7
D3	MA151K	(MH)	B5	
D4	MA151K	(MH)	C4	
D5	MA151K	(MH)	B5	
D6	MA151K	(MH)	B5	
D7	MA151K	(MH)	B5	
D8	1S1925	B5		
D9	1S1925	B5		IC1 MN3801 F5
D10	MA151K	(MH)	D3	
D11	MA151WK	(MT)	C3	
D12	MA157	D3		

Process VIC1, 2 and 3 Board				
IC1	YFNJM1496M	F4		
Q1	2SC2404-CD	(U)	F4	
Q2	2SC2404-CD	(U)	F4	
Q3	2SC2404-CD	(U)	F4	
Q4	2SC2405STU	(S)	F4	
Q5	2SC2404-CD	(U)	F4	
Q6	2SC2405STU	(S)	F4	
Q7	2SC2404-CD	(U)	F4	
Q8	2SC2404-CD	(U)	F4	
Q9	2SC2405STU	(S)	F4	
Q10	2SC2404-CD	(U)	F4	
Q11	2SC2404-CD	(U)	F4	
Q12	2SC2404-CD	(U)	F4	
Q13	2SC2404-CD	(U)	F3	
Q14	2SA1034-ST	(F)	F3	
Q15	2SC2404-CD	(U)	F3	
Q16	2SC2412K7QRS	(BR)	F3	
Q17	2SC2412K7QRS	(BR)	F3	
Q18	2SC2412K7QRS	(BR)	F3	
Q19	2SC2412K7QRS	(BR)	F3	
Q20	2SC2412K7QRS	(BR)	F3	
Q21	2SA1037K7QRS	(FR)	F3	
Q22	2SA1037K7QRS	(FR)	F3	
Q23	2SC2412K7QRS	(BR)	F3	
Q24	2SC2412K7QRS	(BR)	F3	
Q25	2SA1037K7QRS	(FR)	F3	
Q26	2SA1037K7QRS	(FR)	F3	

Process VIC12 Board

Process VIC13 and 14 Board

C

B

A

 COMPONENT SIDE
 PATTERN SIDE

TO
MOTHER BOARD
---CN15
AND
EXT TITLE
CONNECTOR

TO
AUDIO BOARD
---BI4(E4)

TO
MOTHER BOARD
---CN21

TO
MOTHER BOARD
---CN20

TO
EVF CONNECTOR
---CN11

TO
AUTO(C) BOARD
---BI2(E2)

EXT TITLE CORRECTION OUT 4
EXT SC IN 3
GROUND 2
EXT CHARACTER IN 1

FADE CONTROL 5
RETURN CONTROL IN 4
NEGA/POSI CONTROL IN 3
FADE SELECT 1 IN 2
FADE SELECT 2 IN 1

VIDEO OUT / P.B IN 1
GROUND 2

VIDEO OUT 1
GROUND 2

V/F VIDEO OUT 1
GROUND 2

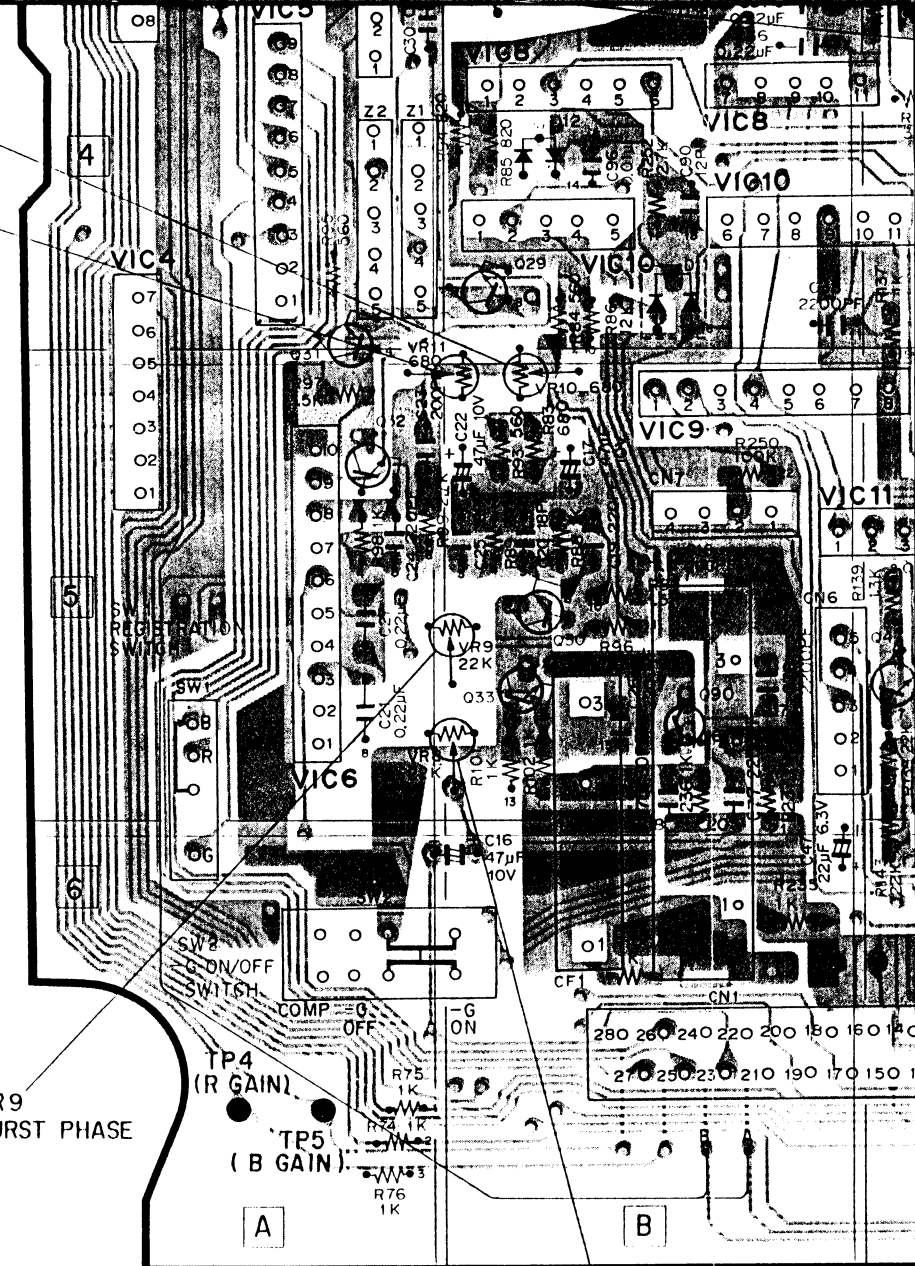
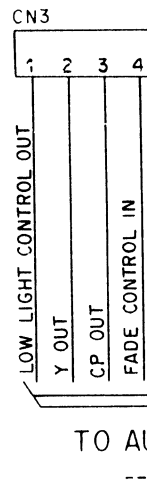
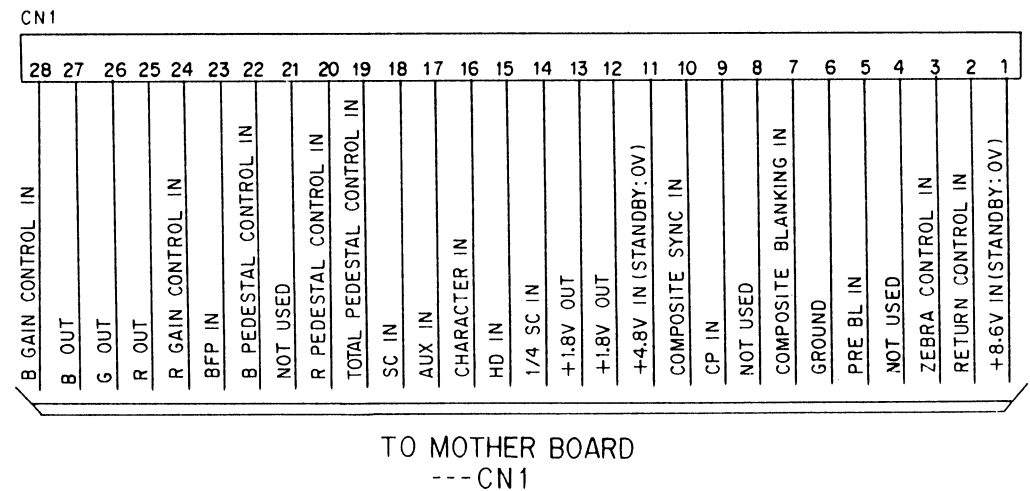
+8.6V OUT (STANDBY: 0V) 1
R BLANKING OFFSET IN 2
B BLANKING OFFSET IN 3
G BLANKING OFFSET IN 4
GROUND 5

VR10
U WHITE BALANCE

VR11
V WHITE BALANCE

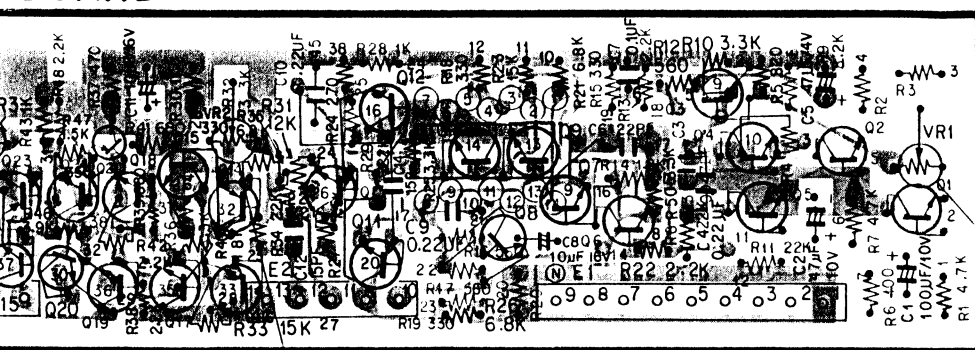
VR9
BURST PHASE

VR8
BURST GAIN



R VIEW OF PROCESS BOARD

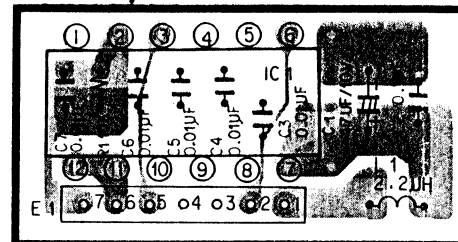
BOARD



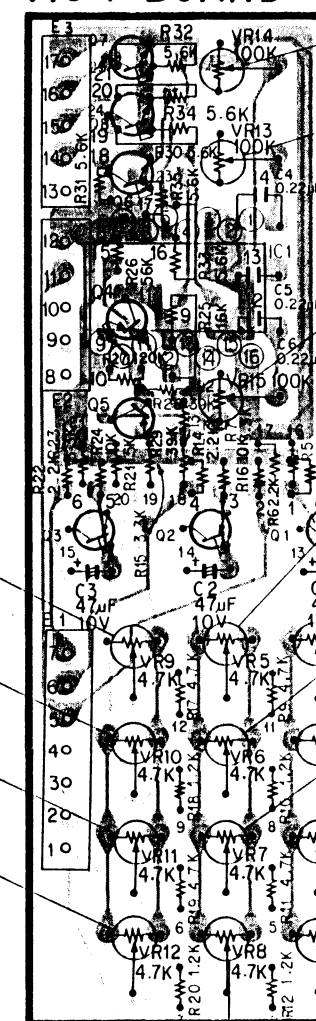
	<u>R2</u>	<u>R3</u>
VIC1	820	330
VIC2	820	330
VIC3	470	68

	<u>VR1</u>	<u>R4</u>
VIC1	470	1.8K
VIC2	330	1.8K
VIC3	330	3.3K

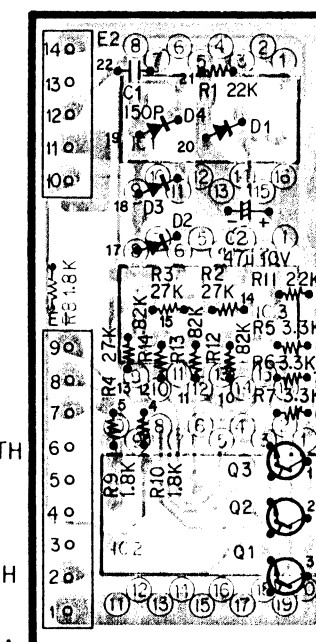
VIC13,14



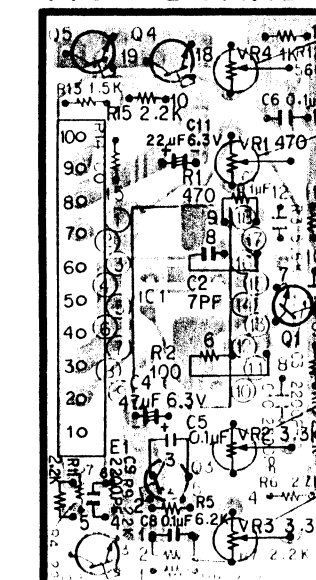
VIC4 BOARD



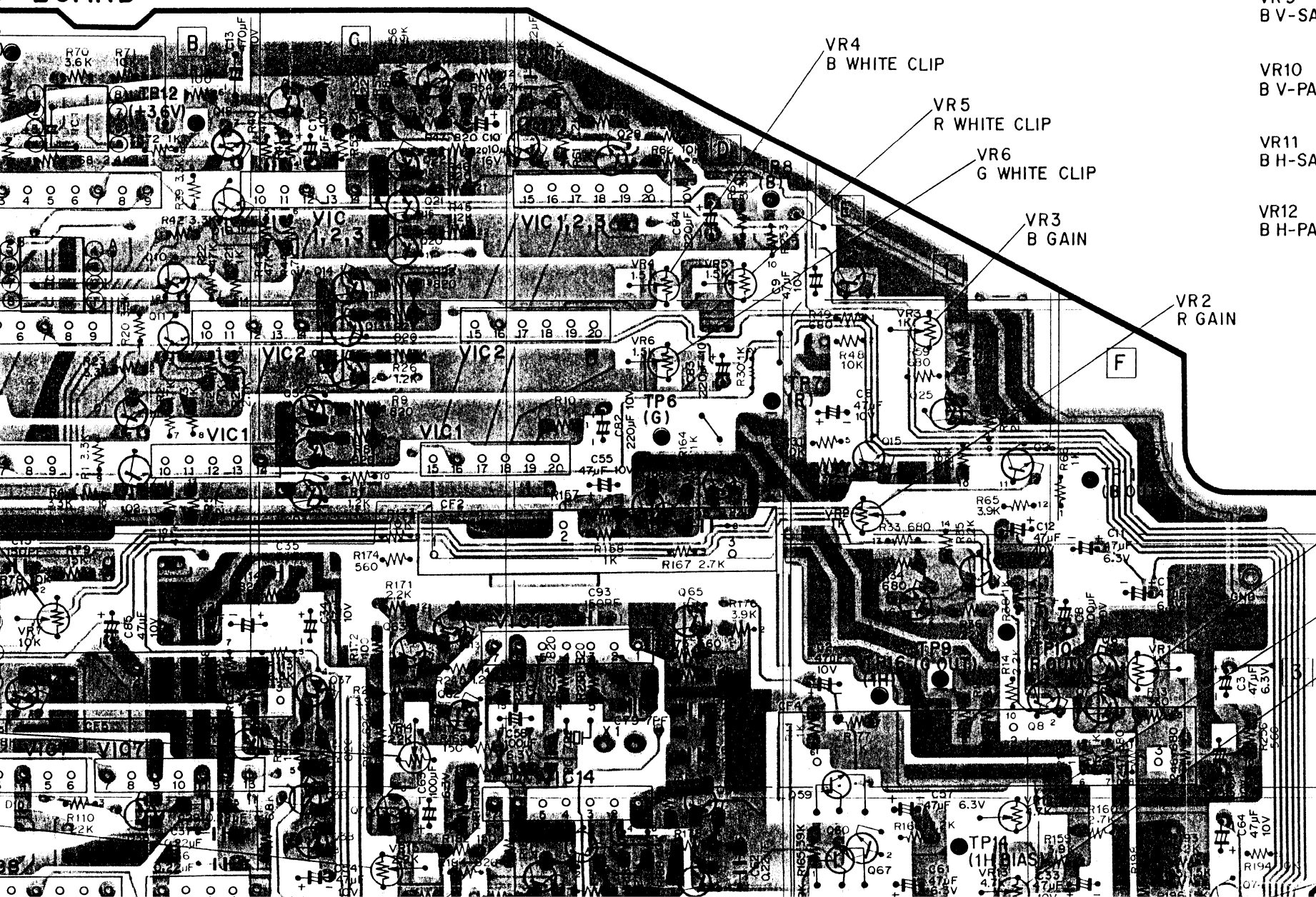
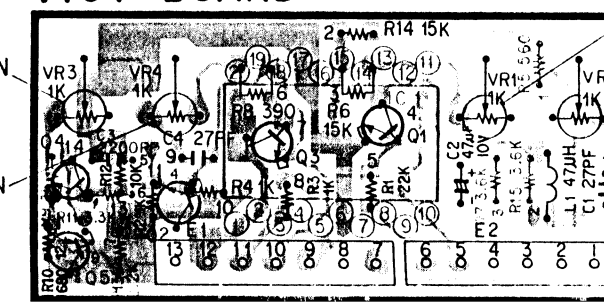
VIC5 BOARD



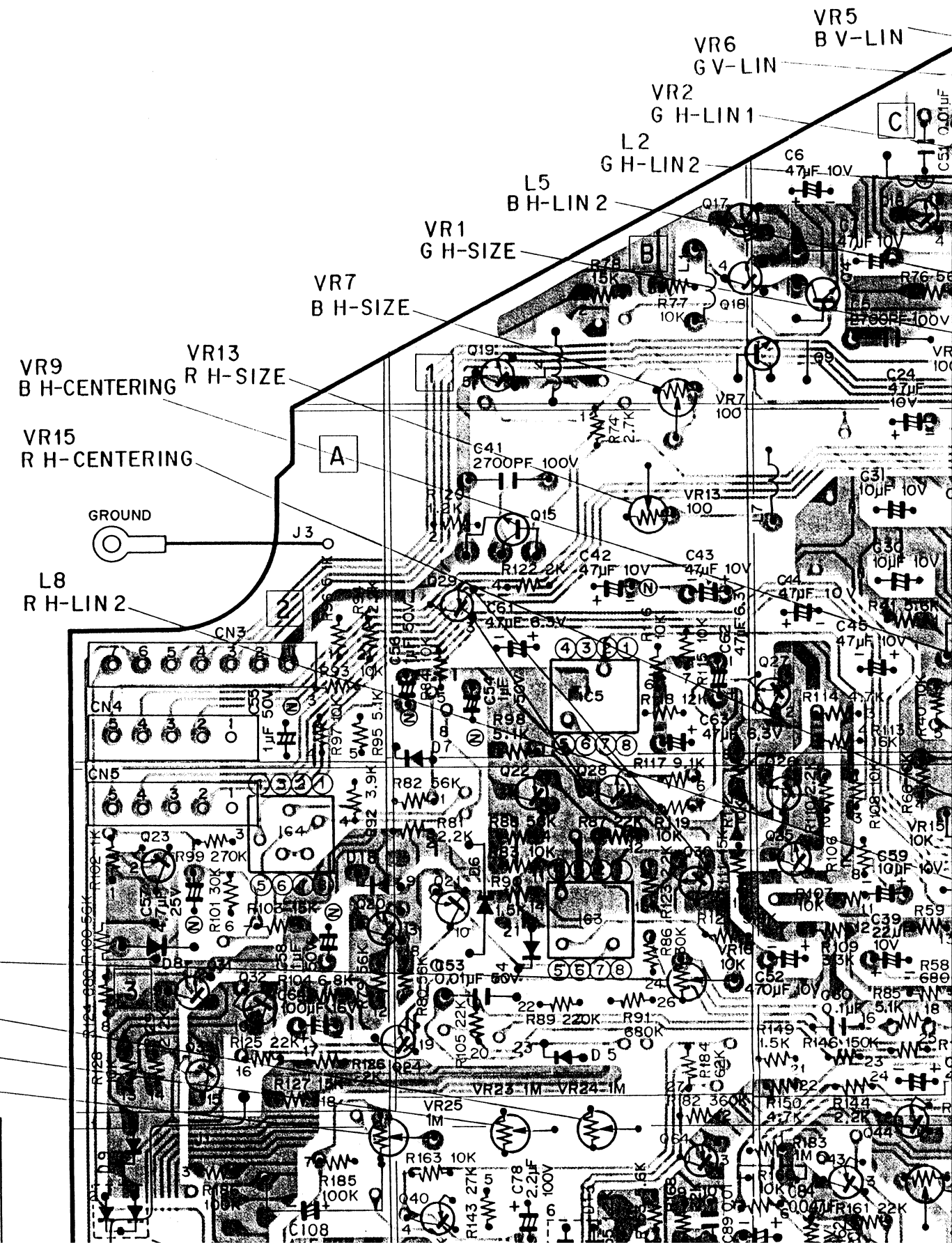
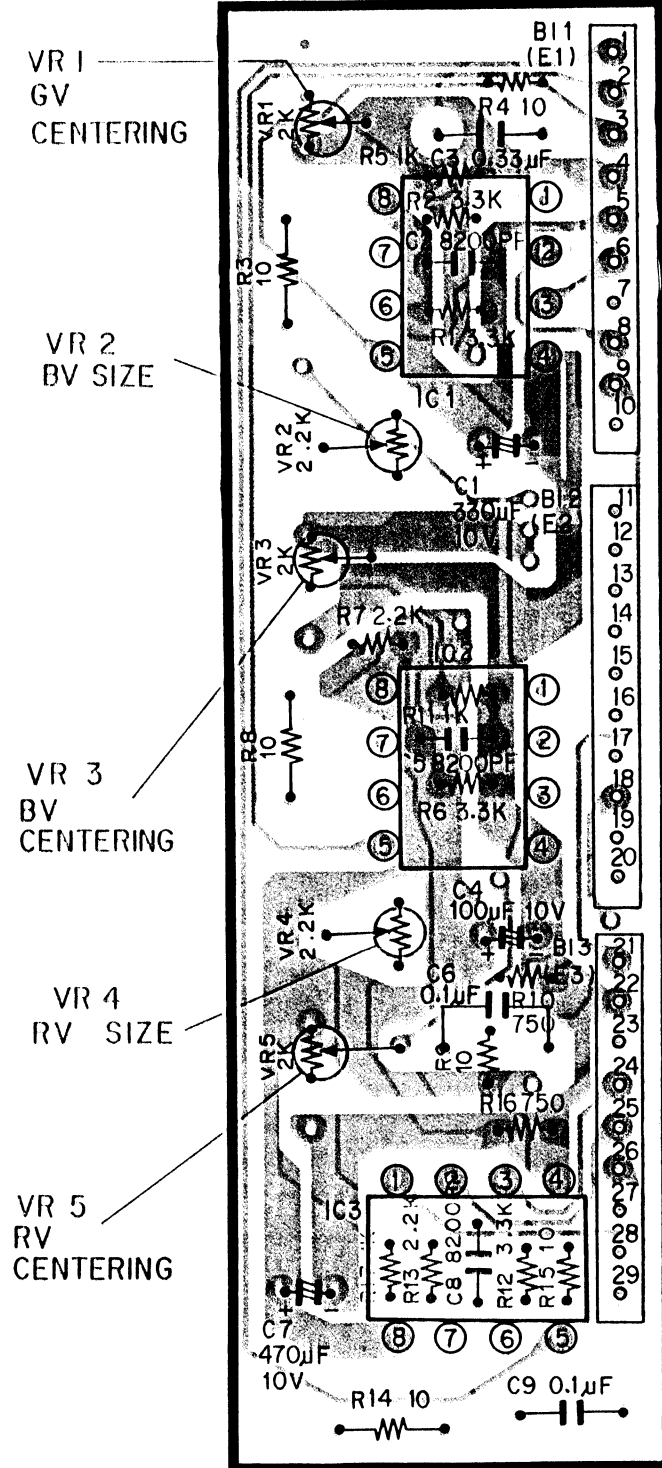
VIC 6 BOARD



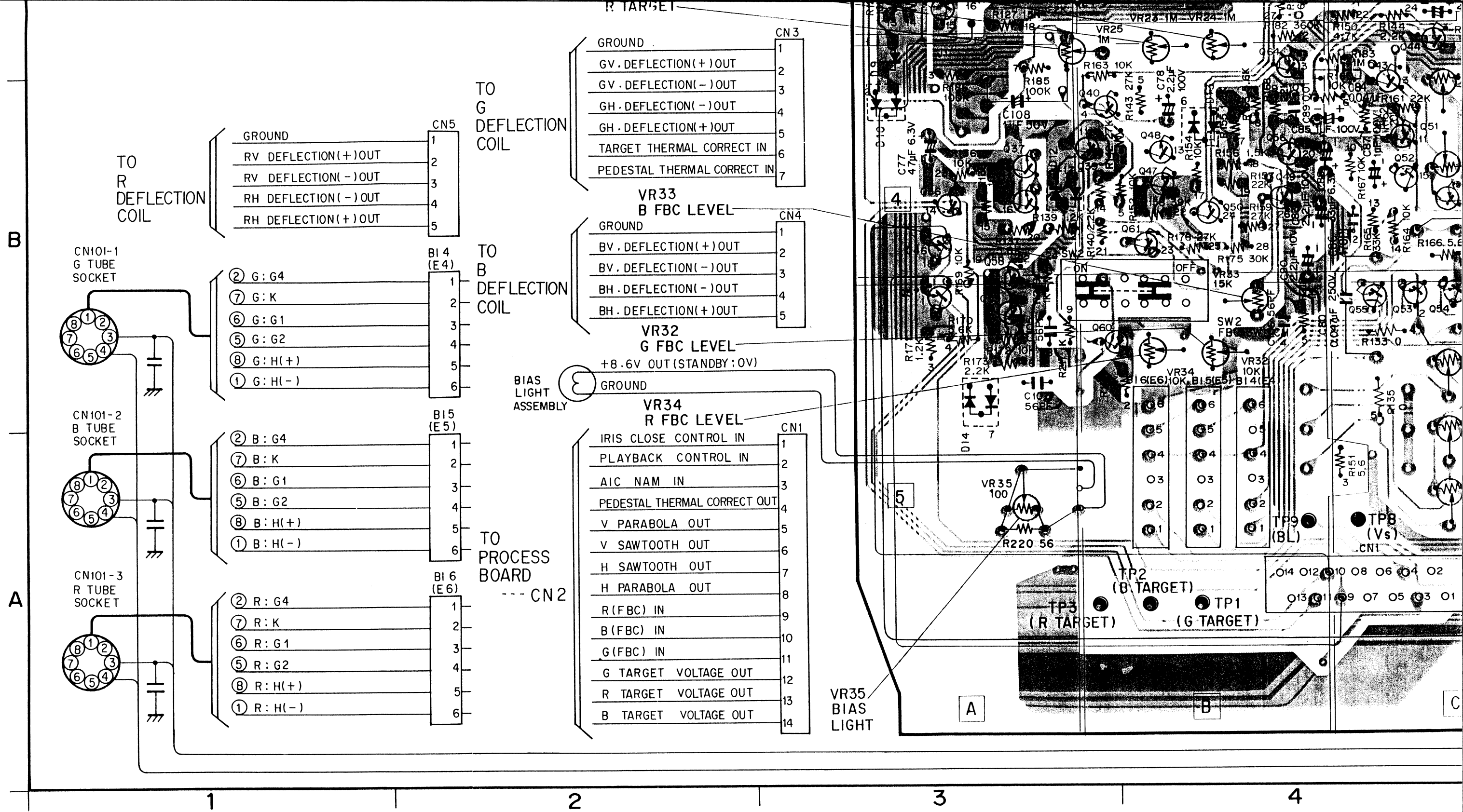
VIC7 BOARD



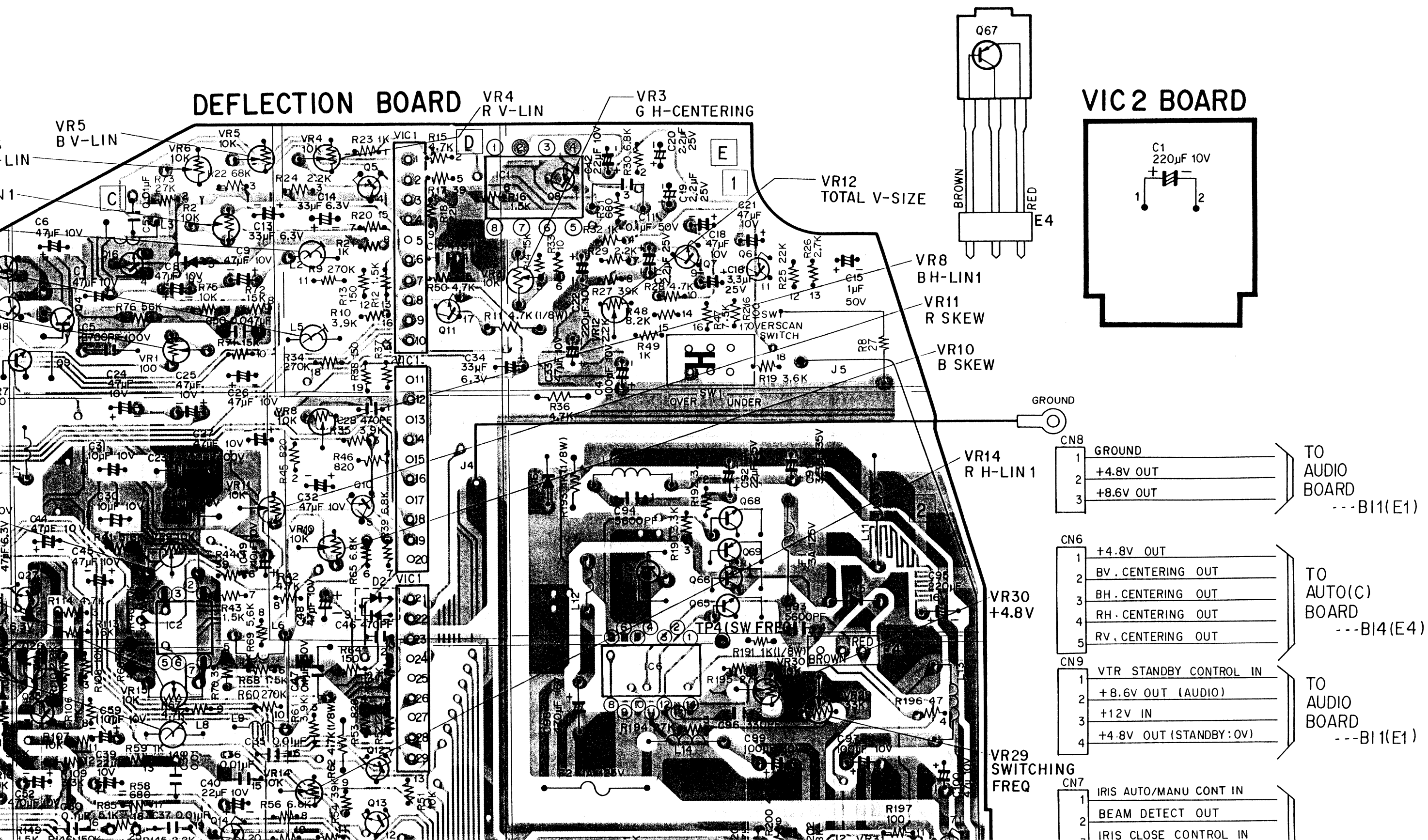
VIC1 BOARD

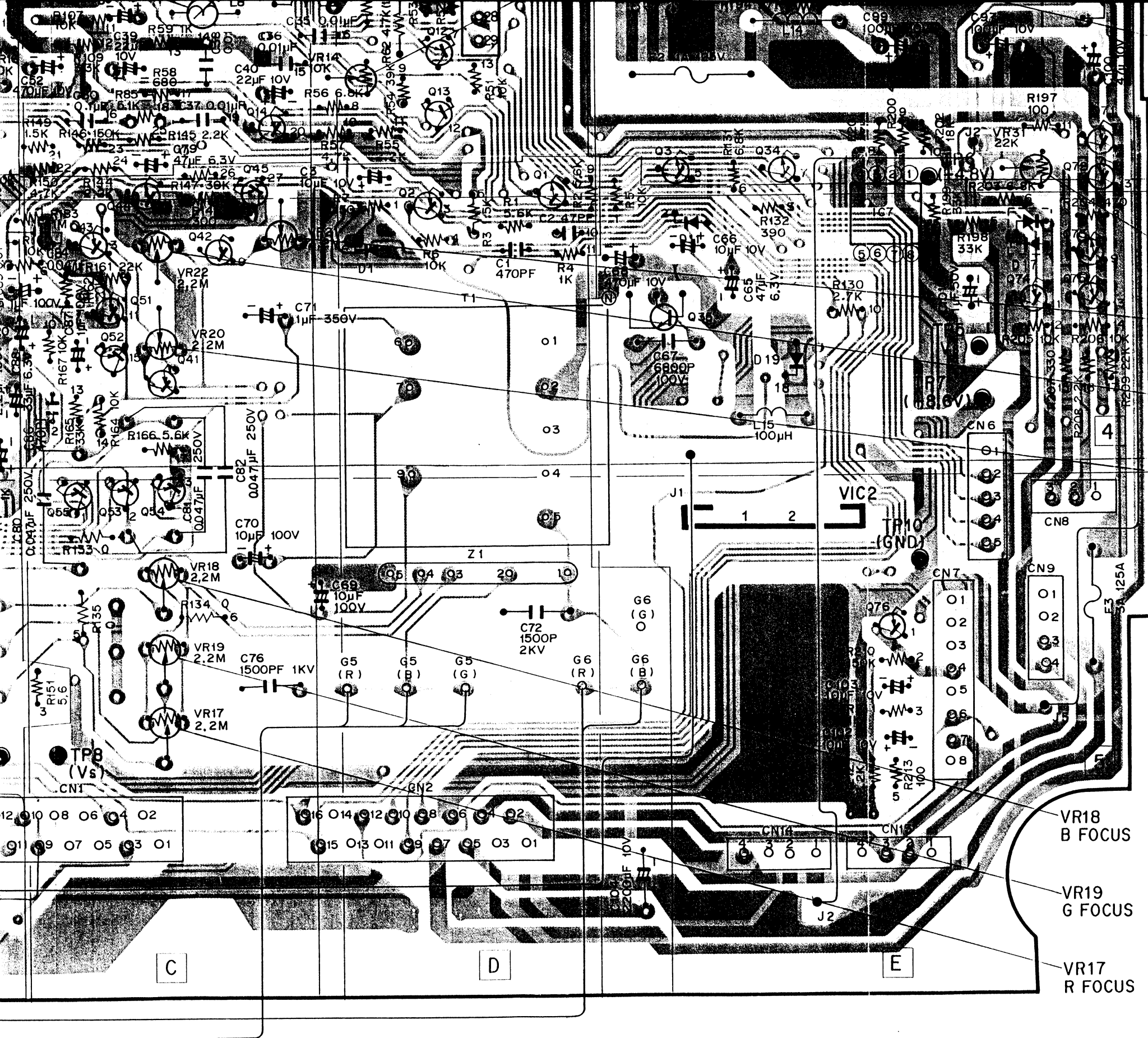


GROUND	CNS
GV · DEFLECTION (+) OUT	1
GV · DEFLECTION (-) OUT	2
GH · DEFLECTION (-) OUT	3
GH · DEFLECTION (+) OUT	4



OF DEFLECTION BOARD





VR29
SWITCHING
FREQ

4	+4.8V OUT (STANDBY:0V)
CN7	IRIS AUTO/MANU CONT IN
1	BEAM DETECT OUT
2	IRIS CLOSE CONTROL IN
3	POWER CONTROL OUT
4	BATTERY WARNING OUT
5	STANDBY CONTROL IN
6	+8.6V OUT (STANDBY:0V)
7	+4.8V OUT (STANDBY:0V)
8	

TO
AUTO(A)
BOARD
---BI1(E1)
---BI5(E3)

VR31
BATT
WARNING

CN13	VDD OUT
1	+4.8V OUT(STANDBY:0V)
2	+8.6V OUT(STANDBY:0V)
3	GROUND
4	

TO
AUTO(B)
BOARD

VR21
B BEAM

VR22
R BEAM

VR20
G BEAM

CN14	+8.6V OUT
1	+4.8V OUT
2	+8.6V IN(STANDBY:0V)
3	+4.8V IN(STANDBY:0V)
4	

CN2	+4.8V OUT
1	+4.8V OUT(STANDBY:0V)
2	+8.6V OUT
3	+8.6V OUT(STANDBY:0V)
4	+12V OUT
5	GROUND
6	GROUND
7	RCU IRIS CONTROL IN
8	REC CONTROL IN
9	HD IN
10	+12V OUT
11	STANDBY CONTROL OUT
12	REMOTE CONTROL OUT
13	AIC NAM OUT
14	PRL BL IN
15	Vs IN
16	

TO
MOTHER
BOARD
---CN2

VR18
B FOCUS

VR19
G FOCUS

VR17
R FOCUS

●---● COMPONENT SIDE
●---● PATTERN SIDE

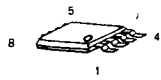
5

6

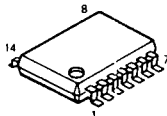
7

DEFLECTION BOARD

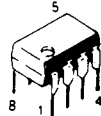
NJM3415M
NJM4558M
NJM2904M



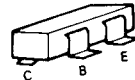
NJM2048MC



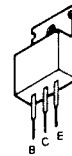
NJM3415D



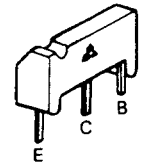
2SA1037K7QRS
2SC2412K7QRS
2SB710-QRS
2SD602-QRS
2SD1257A-PQ
2SB814-QRS



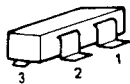
2SB953A-PQ



2SD1083
2SB929-PQ
2SD973-QRS
2SB793-QRS

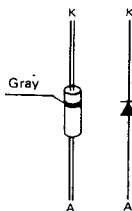


DA204KT7



1 : Cathode
2 : Anode
3 : Common

05Z2.7



MA4068M

MA151WK



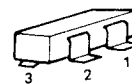
1 : Anode
2 : Anode
3 : Cathode

MA157



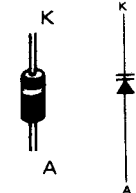
1 : Cathode
2 : Anode
3 : Cathode/
Anode

MA151K



1 : NC
2 : Anode
3 : Cathode

EK14



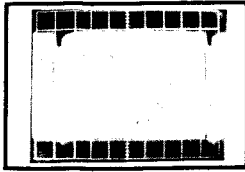
Deflection Board

IC1	NJM3415D	E5, E6	Q31	2SD602-QRS (W)	C3	Q70	2SB929-PQ	C6
IC2	NJM3415M	C5	Q32	2SC2412K7QRS (BR)	C3	Q71	2SA1037K7QRS (FR)	C7
IC3	NJM4558M	C4	Q33	2SA1037K7QRS (FR)	C3	Q72	2SB710-QRS (C)	C7
IC4	NJM2904M	C3	Q34	2SD602-QRS (W)	C6	Q73	2SC2412K7QRS (BR)	B7
IC5	NJM4558M	C4	Q35	2SD1257A-PQ	B6	Q74	2SA1037K7QRS (FR)	B6
IC6	NJM2048MC	C6	Q36	2SA1037K7QRS (FR)	B3	Q75	2SA1037K7QRS (FR)	B7
IC7	NJM2903M	B6, C6	Q37	2SC2412K7QRS (BR)	B3	Q76	2SA1037K7QRS (FR)	A6
Q1	2SC2412K7QRS (BR)	C5	Q38	2SC2412K7QRS (BR)	B3	D1	MA151K (MH)	B5
Q2	2SB710-QRS (C)	C5	Q39	2SB814-QRS (1B)	B3	D2	DA204KT7 (K)	C5
Q3	2SD602-QRS (W)	C6	Q40	2SB814-QRS (1B)	B3	D3	MA151K (MH)	D5
Q4	2SD1083	D4	Q41	2SB814-QRS (1B)	B4	D4	MA151K (MH)	C4
Q5	2SA1037K7QRS (FR)	E5	Q42	2SB814-QRS (1B)	B5	D5	MA151K (MH)	C4
Q6	2SA1037K7QRS (FR)	D6	Q43	2SB814-QRS (1B)	B4	D6	05Z2.7	C4
Q7	2SC2412K7QRS (BR)	D6	Q44	2SC2412K7QRS (BR)	C4	D7	MA151K (MH)	C3
Q8	2SA1037K7QRS (FR)	E6	Q45	2SA1037K7QRS (FR)	C5	D8	MA4068M	C3
Q9	2SD1083	D4	Q46	2SA1037K7QRS (FR)	B3	D9	MA151K (MH)	C3
Q10	2SA1037K7QRS (FR)	D5	Q47	2SC2412K7QRS (BR)	B4	D10	MA151WK (MT)	B3
Q11	2SC2412K7QRS (BR)	D5	Q48	2SC2412K7QRS (BR)	B4	D11	MA151K (MH)	C6
Q12	2SA1037K7QRS (FR)	C5	Q49	2SB814-QRS (1B)	B4	D12	MA157	B3
Q13	2SC2412K7QRS (BR)	C5	Q50	2SB814-QRS (1B)	B4	D13	MA157	B4
Q14	2SA1037K7QRS (FR)	C5	Q51	2SB814-QRS (1B)	B4	D14	MA157	B3
Q15	2SD1083	D4	Q52	2SB814-QRS (1B)	B4	D15	EK14	C6
Q16	2SC2412K7QRS (BR)	D4	Q53	2SB814-QRS (1B)	B4	D16	EK14	D6
Q17	2SC2412K7QRS (BR)	D4	Q54	2SB814-QRS (1B)	B4	D17	DA204KT7 (K)	B6, C6
Q18	2SC2412K7QRS (BR)	D4	Q55	2SB814-QRS (1B)	B4	D18	MA151K (MH)	C3
Q19	2SC2412K7QRS (BR)	D4	Q56	2SC2412K7QRS (BR)	B4	D19	MA151K (MH)	B6
Q20	2SC2412K7QRS (BR)	C3	Q57	2SA1037K7QRS (FR)	B3			
Q21	2SA1037K7QRS (FR)	C4	Q58	2SC2412K7QRS (BR)	B3			
Q22	2SA1037K7QRS (FR)	C4	Q59	2SC2412K7QRS (BR)	B3			
Q23	2SA1037K7QRS (FR)	C3	Q60	2SB814-QRS (1B)	B4			
Q24	2SC2412K7QRS (BR)	C3	Q61	2SB814-QRS (1B)	B4			
Q25	2SC2412K7QRS (BR)	C4	Q64	2SB814-QRS (1B)	B4			
Q26	2SC2412K7QRS (BR)	C4	Q65	2SD973-QRS	C6			
Q27	2SA1037K7QRS (FR)	C4	Q66	2SB793-QRS	C6			
Q28	2SC2412K7QRS (BR)	C4	Q67	YF2SB953A-PQ	D7			
Q29	2SA1037K7QRS (FR)	D4	Q68	2SD973-QRS	E6			
Q30	2SC2412K7QRS (BR)	C4	Q69	2SB793-QRS	E6			

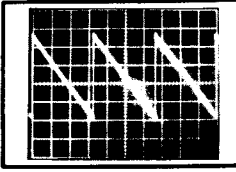
Deflection V IC Board

IC1	NJM3415D	D2
IC2	NJM3415D	D2
IC3	NJM3415D	C2

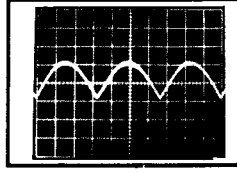
1 20mV/DIV, 2ms/DIV



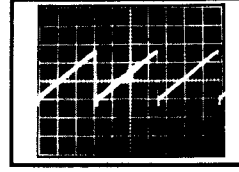
2 0.5V/DIV, 5ms/DIV



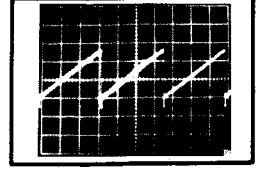
3 0.5V/DIV, 5ms/DIV



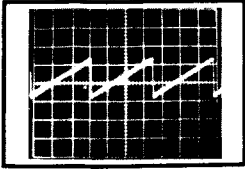
4 2V/DIV, 5ms/DIV



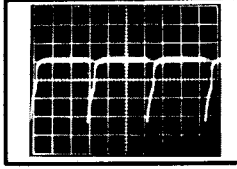
5 2V/DIV, 5ms/DIV



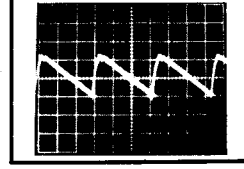
6 20mV/DIV, 5ms/DIV



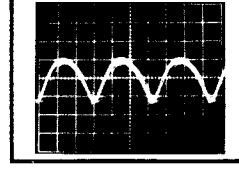
7 1V/DIV, 20μs/DIV



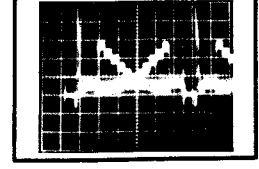
8 1V/DIV, 20μs/DIV



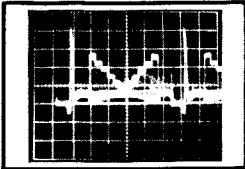
9 0.5V/DIV, 20μs/DIV



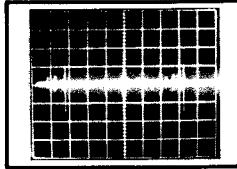
10 0.2V/DIV, 10μs/DIV



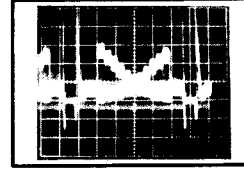
11 0.2V/DIV, 10μs/DIV



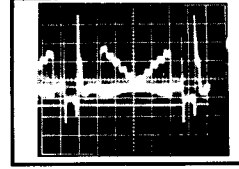
12 0.2V/DIV, 10μs/DIV



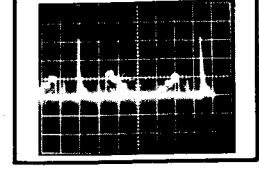
13 0.2V/DIV, 10μs/DIV



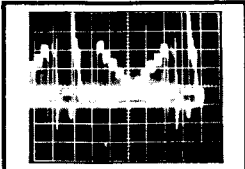
14 0.2V/DIV, 10μs/DIV



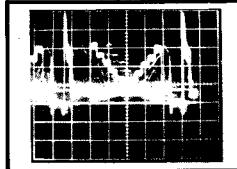
15 0.5V/DIV, 10μs/DIV



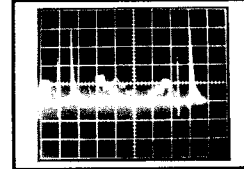
16 0.2V/DIV, 10μs/DIV



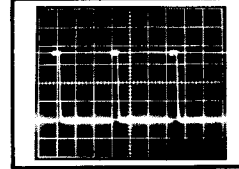
17 0.2V/DIV, 10μs/DIV



18 0.2V/DIV, 10μs/DIV



19 20V/DIV, 20μs/DIV



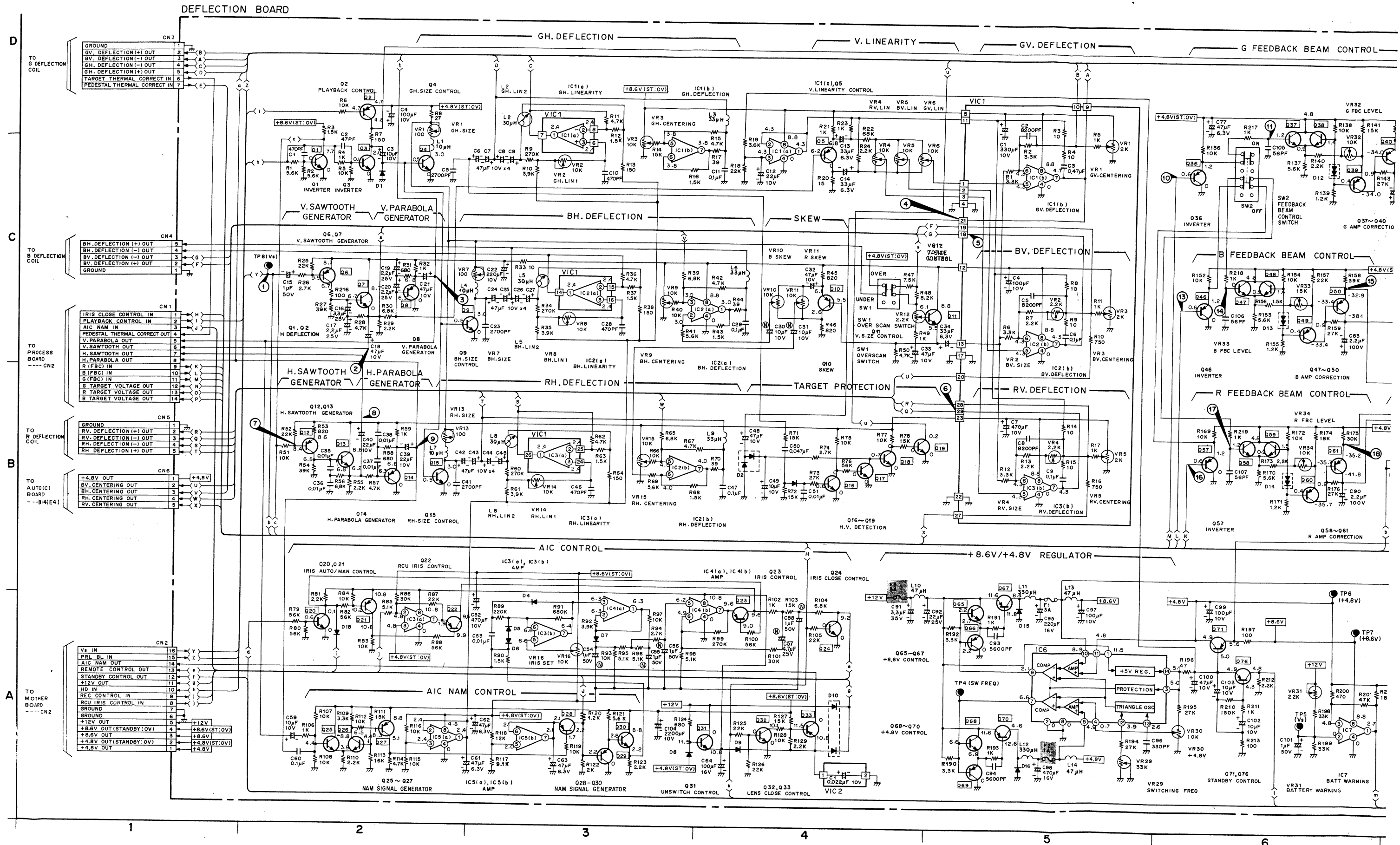
Deflection Board

IC1	NJM3415D	C3, C4	Q31	2SD602-QRS (W)	A4	Q70	2SB929-PQ	A5
IC2	NJM3415M	B3, C4	Q32	2SC2412K7QRS (BR)	A4	Q71	2SA1037K7QRS (FR)	A6
IC3	NJM4558M	A2, A3	Q33	2SA1037K7QRS (FR)	A4	Q72	2SB710-QRS (C)	A7
IC4	NJM2904M	A3, A4	Q34	2SD602-QRS (W)	C8	Q73	2SC2412K7QRS (BR)	A7
IC5	NJM4558M	A2, A3	Q35	2SD1257A-PQ	C8	Q74	2SA1037K7QRS (FR)	A7
IC6	NJM2048MC	A5	Q36	2SA1037K7QRS (FR)	C6	Q75	2SA1037K7QRS (FR)	A7
IC7	NJM2903M	A6	Q37	2SC2412K7QRS (BR)	D6	Q76	2SA1037K7QRS (FR)	A6
Q1	2SC2412K7QRS (BR)	C2	Q38	2SC2412K7QRS (BR)	D6	D1	MA151K (MH)	C2
Q2	2SB710-QRS (C)	D2	Q39	2SB814-QRS (1B)	C6	D2	DA204KT7 (K)	B4
Q3	2SD602-QRS (W)	C2	Q40	2SB814-QRS (1B)	D7	D3	MA151K (MH)	B4
Q4	2SD1083	C2	Q41	2SB814-QRS (1B)	C7	D4	MA151K (MH)	A3
Q5	2SA1037K7QRS (FR)	C4	Q42	2SB814-QRS (1B)	C7	D5	MA151K (MH)	A3
Q6	2SA1037K7QRS (FR)	C2	Q43	2SB814-QRS (1B)	C7	D6	05Z2.7	A3
Q7	2SC2412K7QRS (BR)	C2	Q44	2SC2412K7QRS (BR)	C8	D7	MA151K (MH)	A3
Q8	2SA1037K7QRS (FR)	C2	Q45	2SA1037K7QRS (FR)	C8	D8	MA4068M	A3
Q9	2SD1083	C2	Q46	2SA1037K7QRS (FR)	C6	D9	MA151K (MH)	A4
Q10	2SA1037K7QRS (FR)	C4	Q47	2SC2412K7QRS (BR)	C6	D10	MA151WK (MT)	A4
Q11	2SC2412K7QRS (BR)	C5	Q48	2SC2412K7QRS (BR)	C6	D11	MA151K (MH)	C8
Q12	2SA1037K7QRS (FR)	B2	Q49	2SB814-QRS (1B)	C6	D12	MA157	C6
Q13	2SC2412K7QRS (BR)	B2	Q50	2SB814-QRS (1B)	C6	D13	MA157	D6
Q14	2SA1037K7QRS (FR)	B2	Q51	2SB814-QRS (1B)	B7	D14	MA157	B6
Q15	2SD1083	B2	Q52	2SB814-QRS (1B)	B7	D15	EK14	A5
Q16	2SC2412K7QRS (BR)	B4	Q53	2SB814-QRS (1B)	B7	D16	EK14	A5
Q17	2SC2412K7QRS (BR)	B4	Q54	2SB814-QRS (1B)	B7	D17	DA204KT7 (K)	A7
Q18	2SC2412K7QRS (BR)	B4	Q55	2SB814-QRS (1B)	B7	D18	MA151K (MH)	A2
Q19	2SC2412K7QRS (BR)	B4	Q56	2SC2412K7QRS (BR)	B8	D19	MA151K (MH)	A7
Q20	2SC2412K7QRS (BR)	A2	Q57	2SA1037K7QRS (FR)	B6			
Q21	2SA1037K7QRS (FR)	A2	Q58	2SC2412K7QRS (BR)	B6			
Q22	2SA1037K7QRS (FR)	A2	Q59	2SC2412K7QRS (BR)	B6			
Q23	2SA1037K7QRS (FR)	A4	Q60	2SB814-QRS (1B)	B6			
Q24	2SC2412K7QRS (BR)	A4	Q61	2SB814-QRS (1B)	B6			
Q25	2SC2412K7QRS (BR)	A2	Q64	2SB814-QRS (1B)	A7			
Q26	2SC2412K7QRS (BR)	A2	Q65	2SD973-QRS	A5			
Q27	2SA1037K7QRS (FR)	A2	Q66	2SB793-QRS	A5			
Q28	2SC2412K7QRS (BR)	A3	Q67	YF2SB953A-PQ	A5			
Q29	2SA1037K7QRS (FR)	A3	Q68	2SD973-QRS	A5			
Q30	2SC2412K7QRS (BR)	A3	Q69	2SB793-QRS	A5			

Deflection VIC Board

IC1	NJM3415D	C5
IC2	NJM3415D	C5
IC3	NJM3415D	B5

SCHEMATIC DIAGRAM OF DEFLECTION BOARD



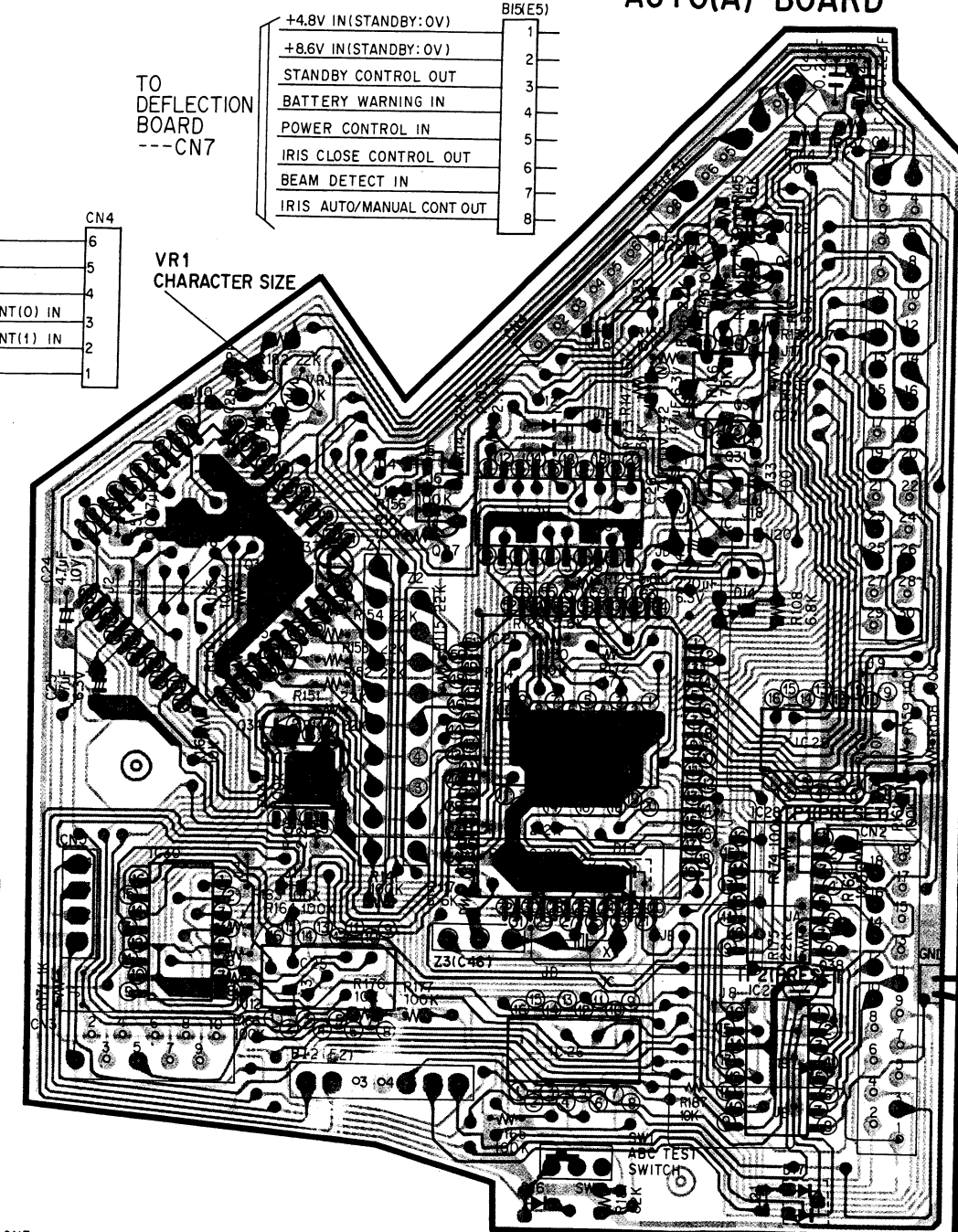
PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.



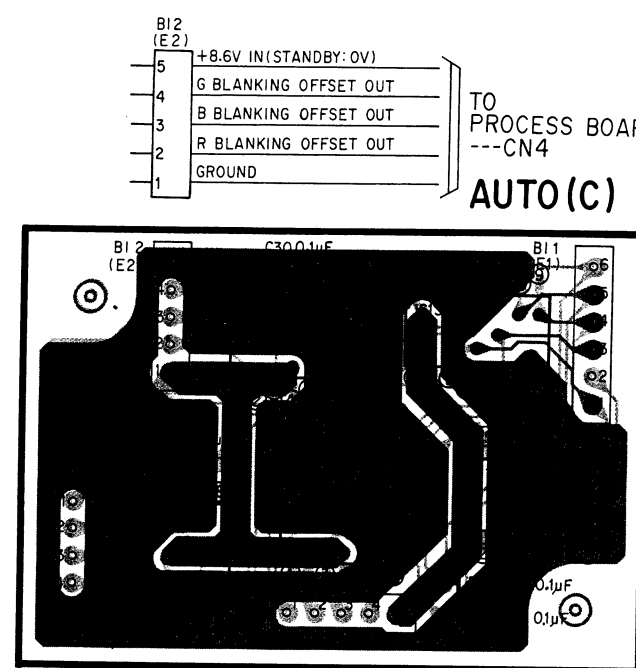
CONDUCTOR VIEW OF AUTO (A), (B) AND (C) BOARD

AUTO(A) BOARD



CN1	D/A OUT	CN6	
2	Vs IN	1	
3	GAIN CONTROL 1 OUT	2	
4	ABC CONTROL IN	3	
5	ACC GAIN CONTROL 2 OUT	4	
6	ACC CONTROL 1 OUT	5	
7	R/B CONTROL OUT	6	
8	ACC CONTROL 2 OUT	7	
9	RESET PULSE IN	8	
10	ATW/ACC CONTROL OUT	9	
11	+5V IN	10	
12	RCU SERIAL CLOCK IN/OUT	11	
13	FADE(VTRI) CONTROL IN	12	
14	RCU SERIAL DATA IN	13	
15	SERIAL DATA IN	14	
16	SERIAL CLOCK IN/OUT	15	
17	TALLY(RCU) CONTROL OUT	16	
18	ACC IN	17	
19	H GATE PULSE IN	18	
20	TALLY DETECT OUT	19	
21	GREEN CONTROL OUT	20	
22	+5V IN	21	
23	GATE CONTROL IN	22	
24	ACC GAIN CONTROL 1 OUT	23	
25	Vs IN	24	
26	V TIMING PULSE IN	25	
27	AWB IN	26	
28	ACC CONTROL OUT	27	
29	ACC IN	28	
30	Y OUT	29	
		30	

AUTO(C) BOARD



BI2 (E2)	+8.6V IN(STANDBY:OV)	TO PROCESS BOARD ---CN4
5	G BLANKING OFFSET OUT	
4	B BLANKING OFFSET OUT	
3	R BLANKING OFFSET OUT	
2	GROUND	
1		

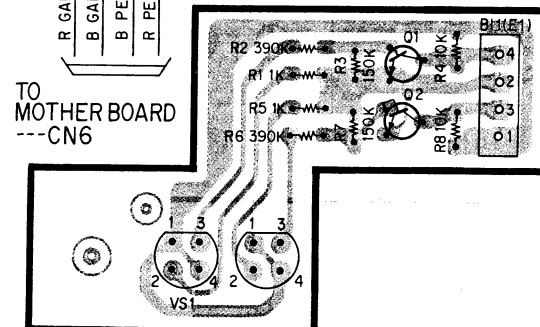
TO DEFLECTION BOARD ---CN7

BI5(E5)	+4.8V IN(STANDBY:OV)	
1	+8.6V IN(STANDBY:OV)	
2	STANDBY CONTROL OUT	
3	BATTERY WARNING IN	
4	POWER CONTROL IN	
5	IRIS CLOSE CONTROL OUT	
6	BEAM DETECT IN	
7	IRIS AUTO/MANUAL CONT OUT	
8		

BI3 (E3)	4 3 2 1	
	R GAIN CONTROL OUT	
	B GAIN CONTROL OUT	
	B PEDESTAL CONTROL OUT	
	R PEDESTAL CONTROL OUT	

BI4 (E4)	5 4 3 2 1	
	+4.8V IN	
	BV. CENTERING OUT	
	RH. CENTERING OUT	
	BH. CENTERING OUT	
	RV. CENTERING OUT	

BI1(E1)	4 3 2 1	
	4	TO DEFLECTION BOARD ---CN6
	3	
	2	
	1	



FILTER SENSOR BOARD

CN3	1 2 3 4 5 6 7 8 9 10	
	GROUND	
	DETAIL ON/OFF CONTROL OUT	
	CAMERA/BAR SELECT OUT	
	GAIN CONTROL 1 OUT	
	PLAYBACK CONTROL IN	
	GAIN CONTROL 2 OUT	
	FADE CONTROL OUT	
	CP IN	
	Y IN	
	LOW LIGHT CONTROL IN	

BI2 (E2)	1 2 3 4 5 6 7	
	POWER LED CONTROL IN	
	VTR LED CONTROL IN	
	10PIN/14PIN SELECT IN	
	VTR ALARM IN	
	VTR COMPATIBILITY IN	
	BATT ALARM IN	
	AUDIO SELECT CONT IN	

CN2	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	
	CHARACTER IN	
	TALLY CONT IN	
	ATW B IN	
	FADE SW IN	
	REC REVIEW CONT IN	
	ABC SW IN	
	+6dB GAIN CONT IN	
	AWC 1/2 IN	
	REC CONTROL IN	
	CHECK ON SW IN	
	ATW R IN	
	+12dB GAIN CONT IN	
	RCU CONTROL IN	
	ATW CONTROL IN	
	ACC SW IN	
	AWC SW IN	
	AWC PRESET IN	
	CHECK OFF SW IN	
	CAMERA/BAR SELECT IN	

TO PROCESS BOARD ---CN3

TO AUDIO BOARD ---

TO MOTHER BOARD ---CN4

Auto (A) Board		
IC18	MN1237B	C3
IC19	TC40H374F	C4
IC20	TC40H374F	B4
IC21	YFUPD7516HG1	B4
IC22	NJM3414M	C4
IC25	AN90B82S	B3
IC26	AN90B82S	B4
IC27	AN90B82S	B4
IC28	AN90B82S	B4
IC29	AN90B82S	B4
IC30	AN90B82S	B3
IC31	NJM4558M	B3
Q25	2SA1022-BC	(E) B4
Q27	2SC2412K7QRS	(BR) C3
Q28	2SC2412K7QRS	(BR) D4
Q29	2SA1037K7QRS	(FR) D4
Q30	2SA1037K7QRS	(FR) D4
Q31	2SA1037K7QRS	(FR) C4
Q32	2SA1037K7QRS	(FR) C4
Q33	2SC2412K7QRS	(BR) B3
Q34	2SC2412K7QRS	(BR) B3
Q35	2SC2412K7QRS	(BR) C3
Q36	2SC2412K7QRS	(BR) C3
Q37	2SC2412K7QRS	(BR) C3
Q38	2SC2412K7QRS	(BR) B4
D12	DAN202KT7	(N) C4
D13	DAN202KT7	(N) B4
D14	MA151K	(MH) C4
D16	MA151K	(MH) B9
D17	DAN202KT7	(N) A4
D19	MA151K	(MH) B4
D20	MA151K	(MH) C3
D22	MA165	C3
D23	MA165	D4
Auto (B) Board		
IC1	NJM592M8	B7
IC2	NJM4558M	B7
IC3	NJU4053BM	B7, C7
IC4	NJM062M	C7
IC5	NJM319M	C7
IC6	BA226AF	C7
IC7	M51325P	B6
IC8	M51325P	B6
IC9	NJU4053BM	B6
IC10	NJM2904M	B6
IC11	NJU4053BM	C6
IC12	NJM2903M	C6
IC24	BA226AF	C7
Q1	2SC2412K7QRS	(BR) C7
Q2	2SC2412K7QRS	(BR) C7
Q3	2SC2404QRSTW	(U) C7
Q4	2SA1037K7QRS	(FR) C7
Q5	2SA1022-CD	(E) C7
Q6	2SC2412K7QRS	(BR) C7
Q9	2SA1037K7QRS	(FR) C7
Q10	2SC2412K7QRS	(FR) C7
Q11	2SC2412K7QRS	(BR) B6
Q12	2SC2412K7QRS	(BR) B7
Q13	2SC2412K7QRS	(BR) B6
Q14	2SA1037K7QRS	(FR) B6
Q15	2SC2412K7QRS	(BR) B6
Q16	2SC2412K7QRS	(BR) B7
Q17	2SC2412K7QRS	(BR) B7
Q18	2SC2412K7QRS	(BR) B7
Q19	2SA1037K7QRS	(FR) C7
Q20	2SA1037K7QRS	(FR) C6
Q21	2SC2412K7QRS	(BR) C7
Q22	2SC2412K7QRS	(BR) C6
Q23	2SC2412K7QRS	(BR) C7
Q24	2SC2412K7QRS	(BR) C7
Q25	2SC2412K7QRS	(BR) C7
Q39	2SC1684	B7
D1	1SS141	B7
D2	MA151K	(MH) B7
D3	1SS141	B7
D4	DAN202KT7	(N) C7
D5	DAP202KT7	(N) C7
D6	DA204KT7	(K) B7
D7	DA204KT7	(K) B6
D8	MA151K	(MH) B6
D9	1SS99	B7
D10	MA151K	(MH) B7
D11	MA151K	(MH) B7
D18	MA151K	(MH) C6
D21	MA165	
Auto (C) Board		
IC13	NJU4051BM	C2
IC14	NJU4051BM	C2
IC15	YFNJM064M	C1
IC16	YFNJM064M	C1
IC17	YFNJM064M	C1
Filter Sensor Board		
Q1	2SA1034-ST	(F) B1
Q2	2SA1034-ST	(F) B1

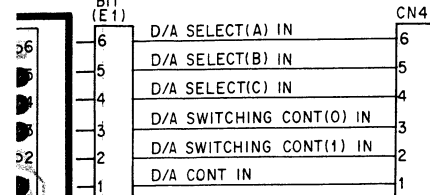
CONDUCTOR VIEW OF AUTO (A), (B) AND (C) BOARD

AUTO(A) BOARD

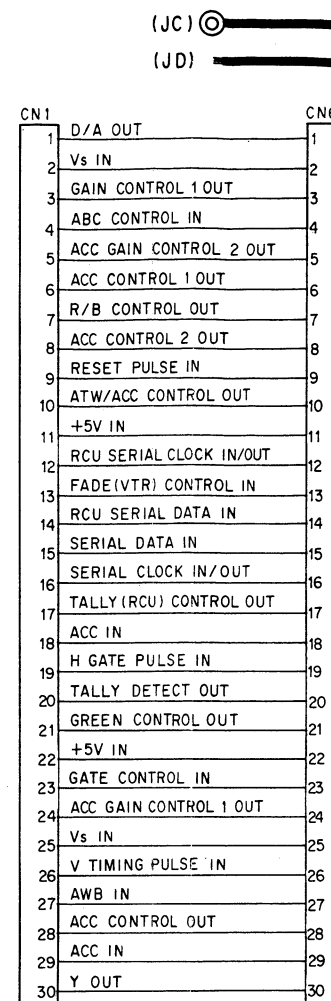
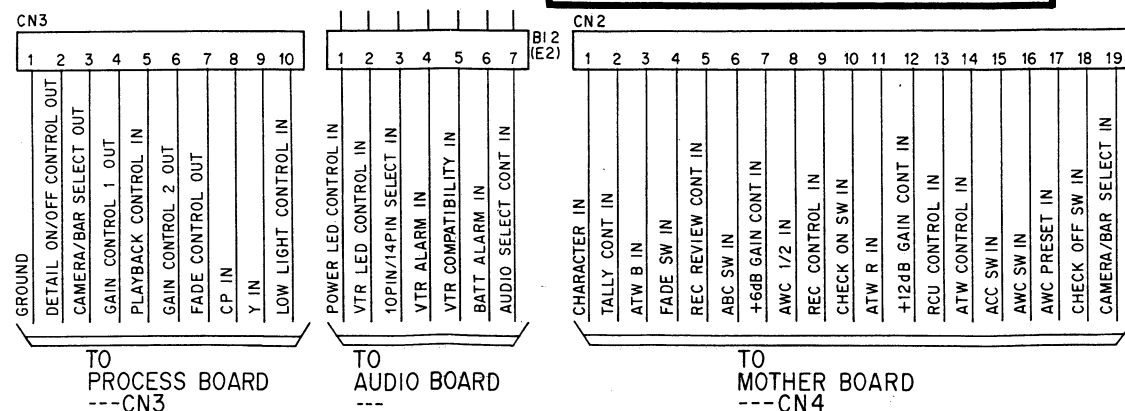
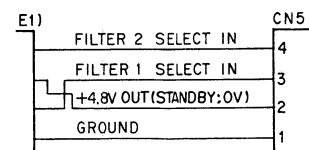
AUTO(B) BOARD

BOARD

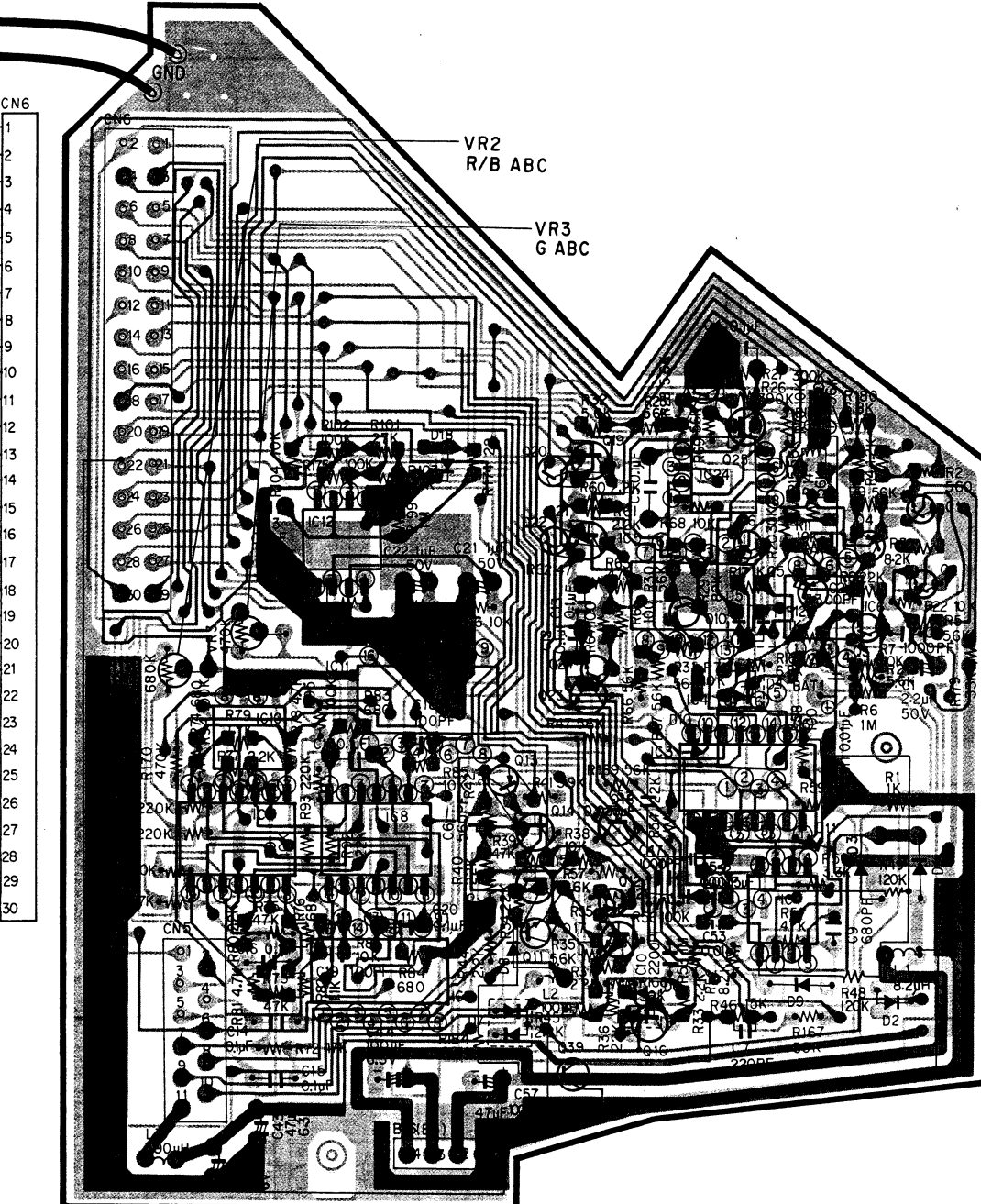
BOARD



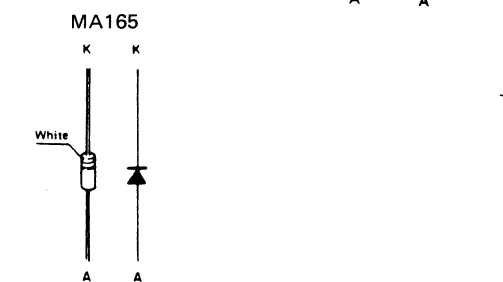
TO DEFLECTION BOARD ---CN6



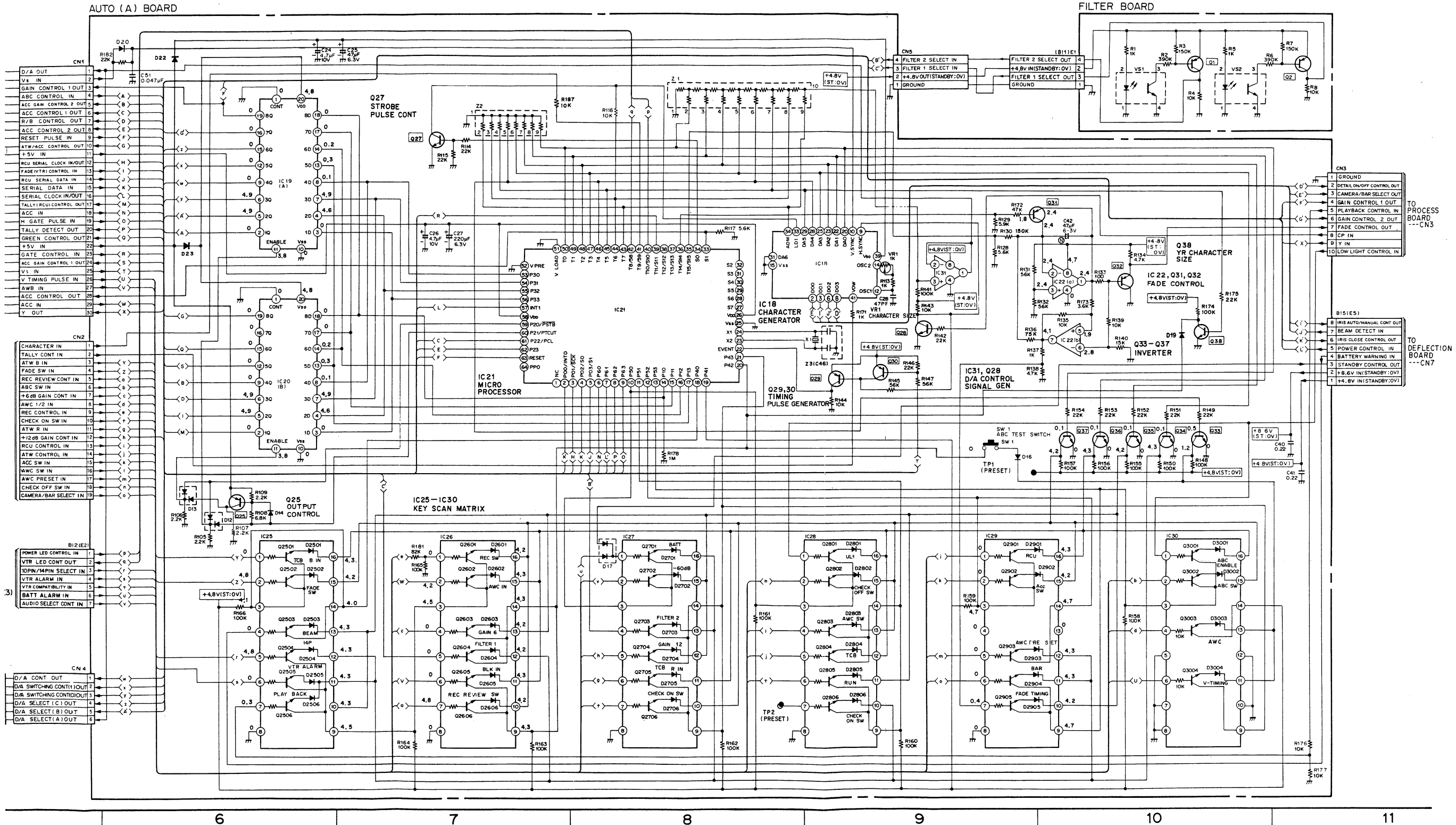
(JB) (JA)



COMPONENT SIDE
PATTERN SIDE

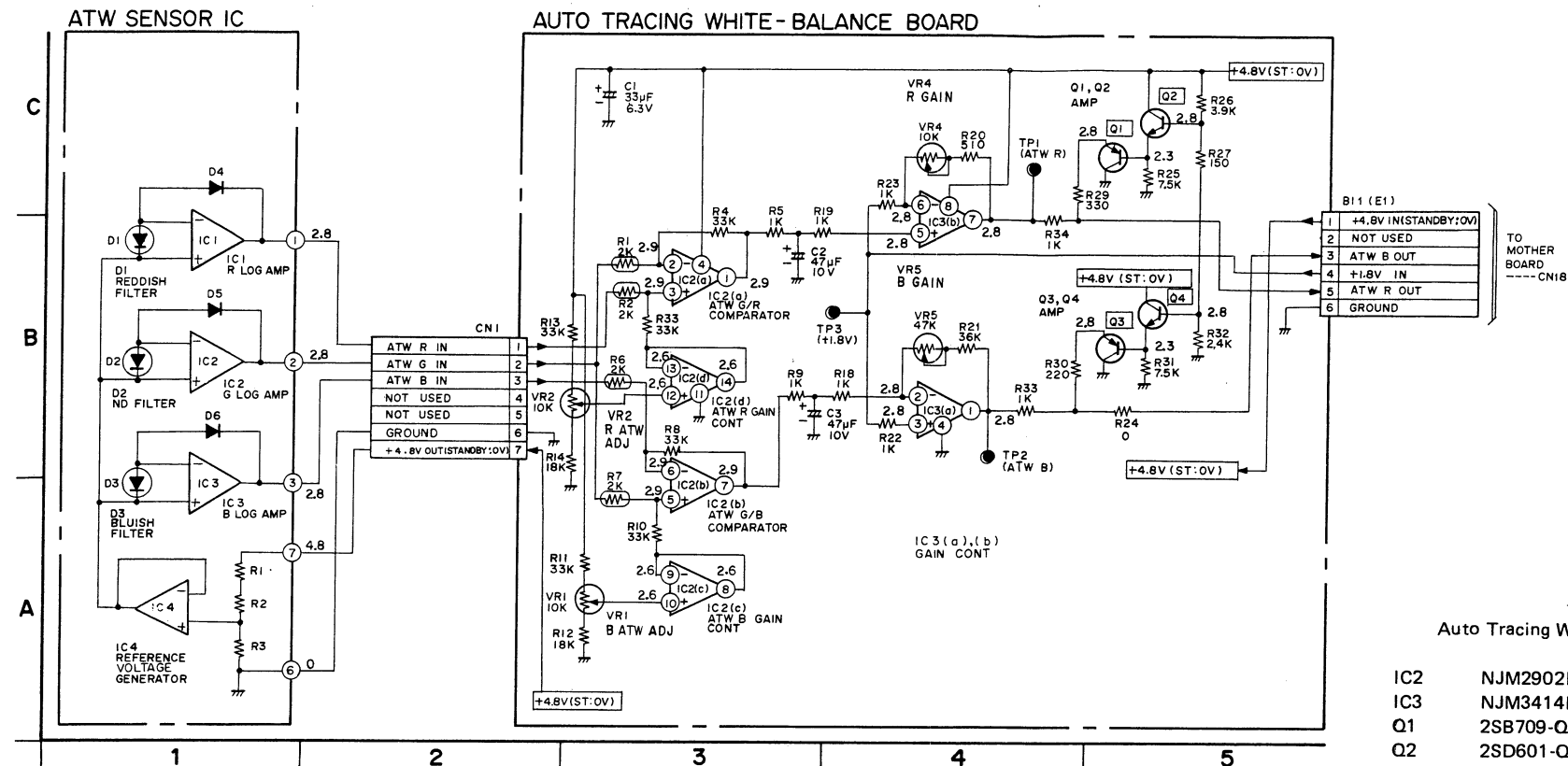


RAM OF AUTO (A), (B) AND (C) BOARD



Auto (A) Board		
IC18	MM1237B	C8, C9
IC19	TC40H374F	C6
IC20	TC40H374F	B6, C6
IC21	YFUPD7516HG1	B8, C8
IC22	NJM3414M	C10
IC25	AN90B82S	A6
IC26	AN90B82S	A7
IC27	AN90B82S	A8
IC28	AN90B82S	A9
IC29	AN90B82S	A9
IC30	AN90B82S	A10
IC31	NJA4558M	C9
Q25	2SA1022-8C	(E) B6
Q27	2SC2412K7QRS	(BR) C7
Q28	2SC2412K7QRS	(BR) C9
Q29	2SA1037K7QRS	(FR) B9
Q30	2SA1037K7QRS	(FR) B9
Q31	2SA1037K7QRS	(FR) C9
Q32	2SA1037K7QRS	(FR) C10
Q33	2SC2412K7QRS	(BR) B10
Q34	2SC2412K7QRS	(BR) B10
Q35	2SC2412K7QRS	(BR) B10
Q36	2SC2412K7QRS	(BR) B10
Q37	2SC2412K7QRS	(BR) B10
Q38	2SC2412K7QRS	(BR) C10
D12	DAN202KT7	(N) B6
D13	DAN202KT7	(N) B6
D14	MA151K	(MH) B6
D16	MA151K	(MH) A10
D17	DAN202KT7	(N) B8
D19	MA151K	(MH) C10
D20	MA151K	(MH) D6
D22	MA165	D6
D23	MA165	C6
Auto (B) Board		
IC1	NJM592M8	C2
IC2	NJM4558M	C2, C3
IC3	NJU4053BM	C2
IC4	NJM062M	C2, C3
IC5	NJM319M	C3, C4
IC6	BA226AF	C3, D3
IC7	M51325P	B2
IC8	M51325P	B3
IC9	NJU4053BM	B2, B3
IC10	NJM2904M	B3
IC11	NJU4053BM	B3, B4
IC12	NJM2903M	B4
IC24	BA226AF	C3, D3
Q1	2SC2412K7QRS	(BR) C1
Q2	2SC2412K7QRS	(BR) D2
Q3	2SC2404QRSTW	(U) C2
Q4	2SA1037K7QRS	(FR) D2
Q5	2SA1022-CD	(E) D2
Q6	2SC2412K7QRS	(BR) C2
Q9	2SA1037K7QRS	(FR) C3
Q10	2SC2412K7QRS	(FR) D3
Q11	2SC2412K7QRS	(BR) D4
Q12	2SC2412K7QRS	(BR) C4
Q13	2SC2412K7QRS	(BR) D4
Q14	2SA1037K7QRS	(FR) C4
Q15	2SC2412K7QRS	(BR) C4
Q16	2SC2412K7QRS	(BR) C4
Q17	2SC2412K7QRS	(BR) C2
Q18	2SC2412K7QRS	(BR) C2
Q19	2SA1037K7QRS	(FR) C3
Q20	2SA1037K7QRS	(FR) C3
Q21	2SC2412K7QRS	(BR) C3
Q22	2SC2412K7QRS	(BR) C3
Q23	2SC2412K7QRS	(BR) C4
Q24	2SC2412K7QRS	(BR) C4
Q25	2SC2412K7QRS	(BR) C4
Q39	2SC1684	C4
D1	1SS141	B1
D2	MA151K	(MH) B1
D3	1SS141	B1
D4	DAN202KT7	(N) C2
D5	DAP202KT7	(N) C2
D6	DA204KT7	(K) C3
D7	DA204KT7	(K) D4
D8	MA151K	(MH) C4
D9	1SS99	C2
D10	MA151K	(MH) C3
D11	MA151K	(MH) C3
D18	MA151K	(MH) B4
D21	MA165	
Auto (C) Board		
IC13	NJU4051BM	A4
IC14	NJU4051BM	A4
IC15	YFNJM064M	A3, A4
IC16	YFNJM064M	A2, A3
IC17	YFNJM064M	A3, A4

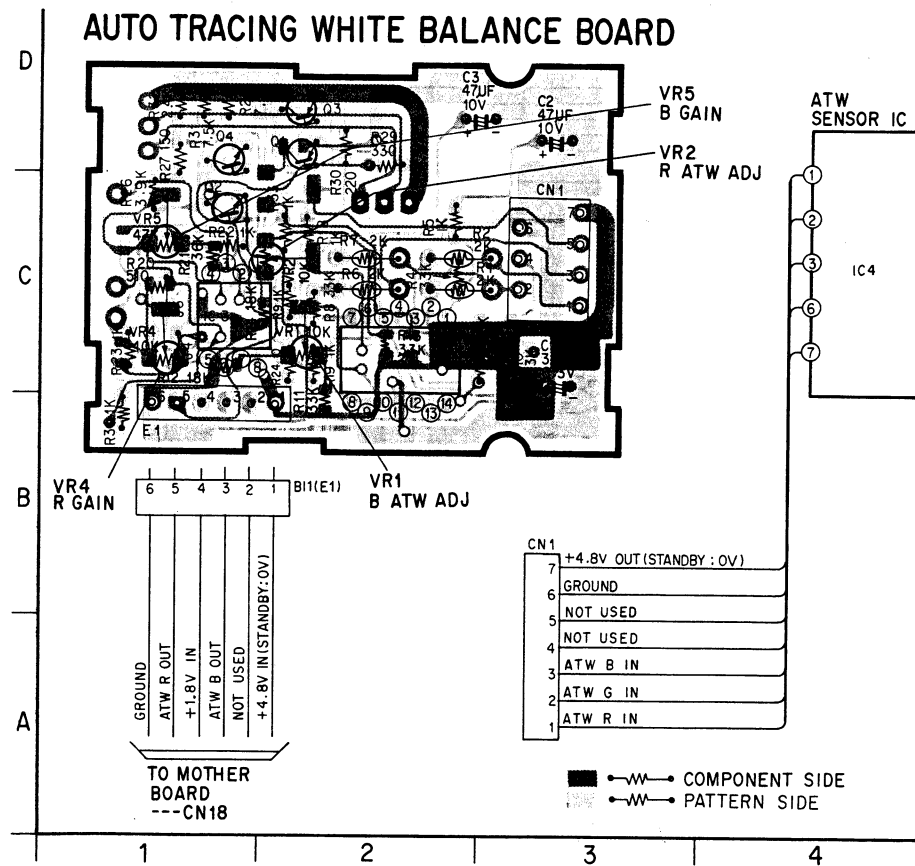
SCHEMATIC DIAGRAM OF AUTO TRACING WHITE-BALANCE BOARD



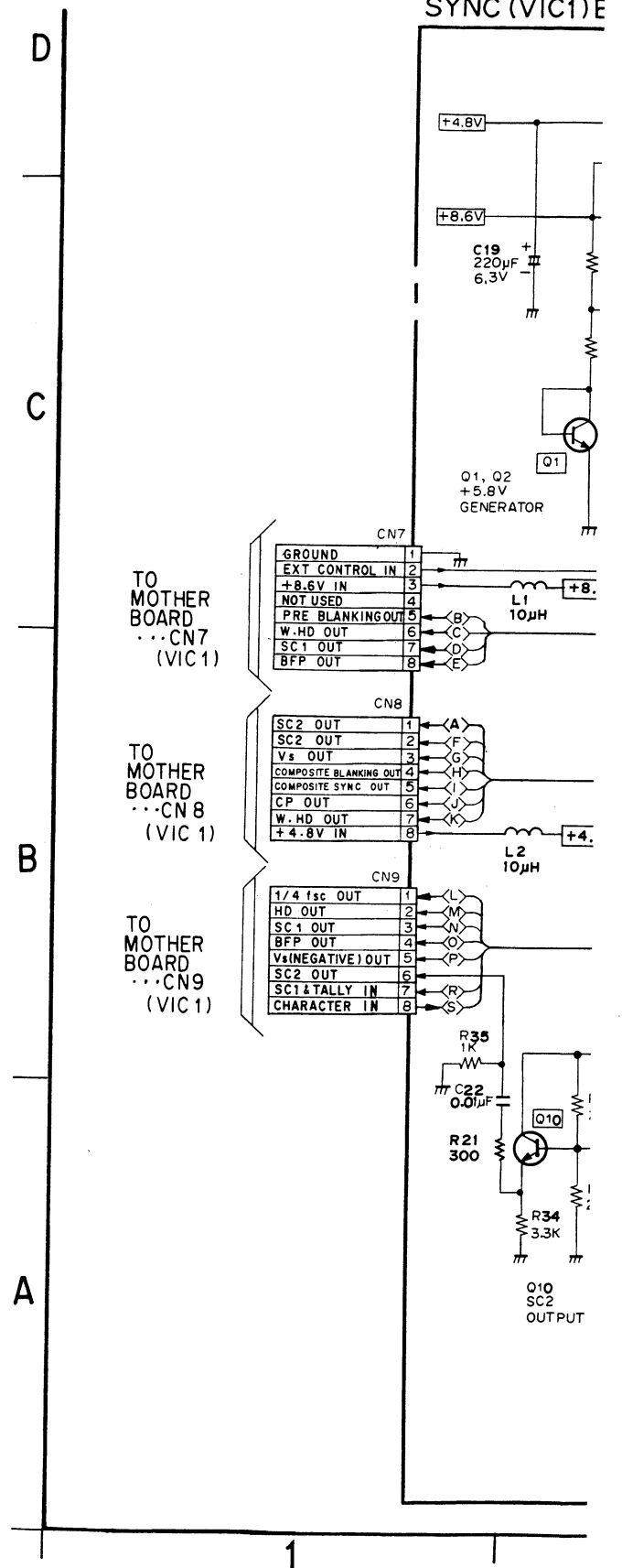
Auto Tracing White-Balance Board

IC2	NJM2902M	A3, B3
IC3	NJM3414M	B4, C4
Q1	2SB709-QRS	(A) C5
Q2	2SD601-QRS	(Y) C5
Q3	2SB709-QRS	(A) B5
Q4	2SD601-QRS	(Y) B5

CONDUCTOR VIEW OF AUTO TRACING WHITE-BALANCE BOARD



SYNC (VIC1)E



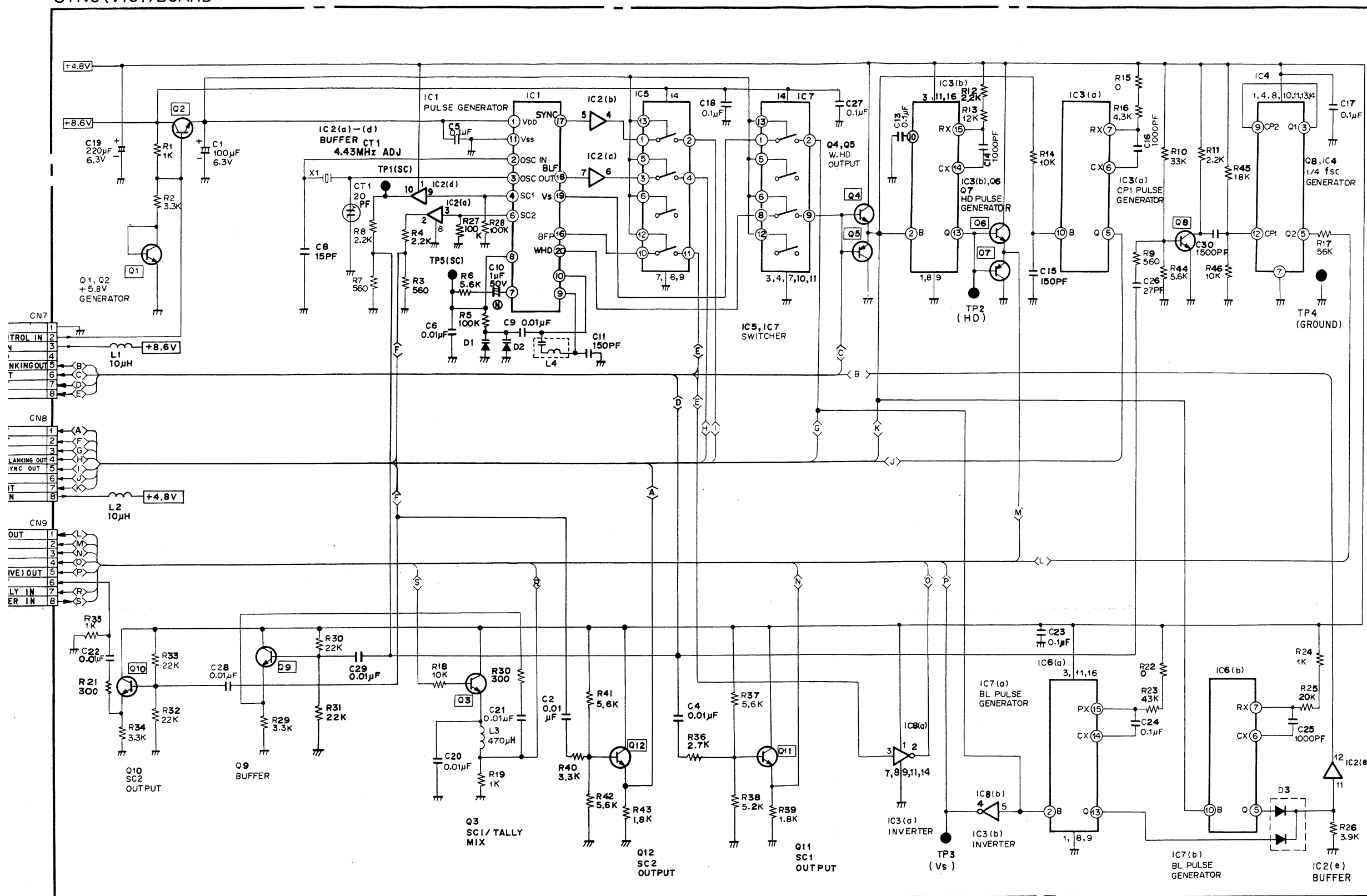
Auto Tracing White-Balance Board

IC2	NJM2902M	C2
IC3	NJM3414M	C1
Q1	2SB709-QRS	(A) D2
Q2	2SD601-QRS	(Y) C1
Q3	2SB709-QRS	(A) D2
Q4	2SD601-QRS	(Y) D1

SCHEMATIC DIAGRAM OF SYNC BOARD

SYNC Board

SYNC (VIC1) BOARD



IC1	MN6160PBS	C3
IC2	MN74HC4050S	A6, C3
IC3	MN74HC221S	C4, C5
IC4	MN74HC107S	C6
IC5	MB84066BF	C3, C4
IC6	MN74HC221S	A5, A6
IC7	MB84066BF	C4
IC8	MN74HC4049S	A4, A5
Q1	2SC2412K7QRS (BR)	C2
Q2	2SC2412K7QRS (BR)	C2
Q3	2SC2412K7QRS (BR)	A3
Q4	2SC2412K7QRS (BR)	C4
Q5	2SA1037K7QRS (FR)	C4
Q6	2SC2412K7QRS (BR)	C5
Q7	2SA1037K7QRS (FR)	C5
Q8	2SC2404-CD (U)	C5
Q9	2SC2412K7QRS (BR)	A2
Q10	2SC2412K7QRS (BR)	A2
Q11	2SC2412K7QRS (BR)	A4
Q12	2SC2412K7QRS (BR)	A3
D1	MA328	C3
D2	MA328	C3
D3	DAN202KT7 (N)	A6

CONDUCTOR VIEW OF SYNC BOARD

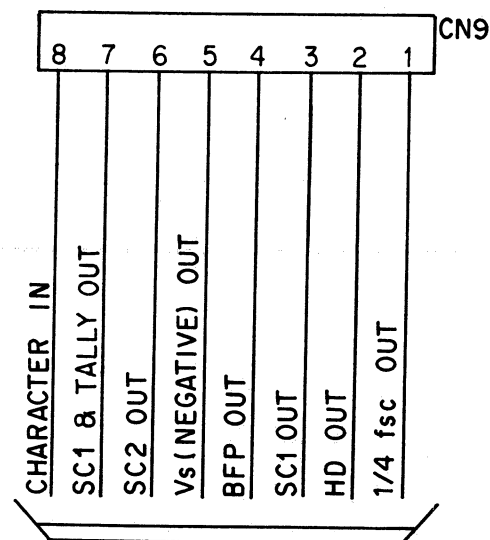
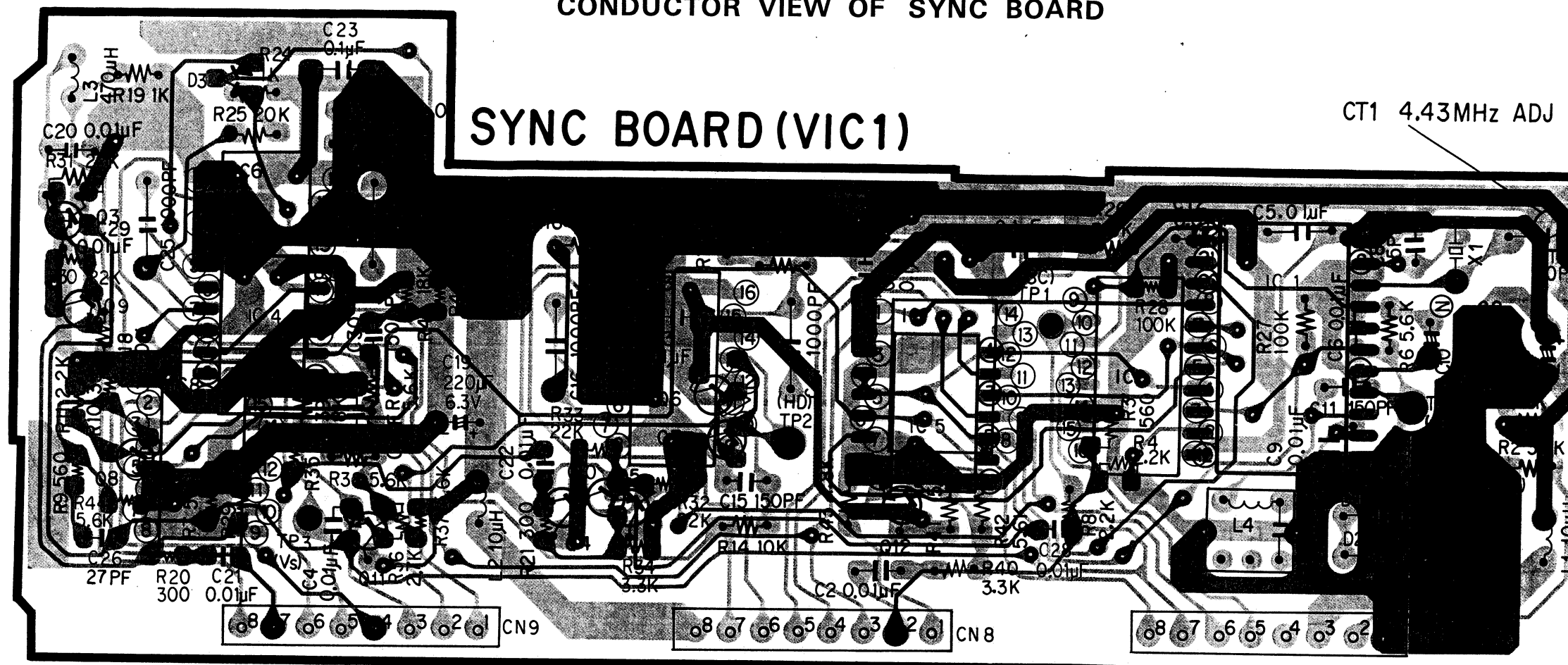
SYNC BOARD (VIC1)

CT1 4.43MHz ADJ

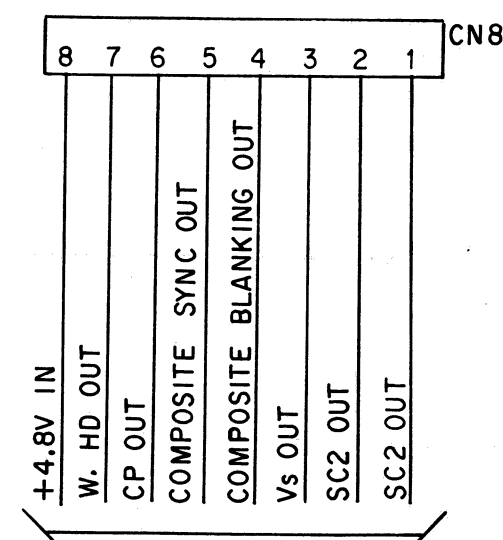
C

B

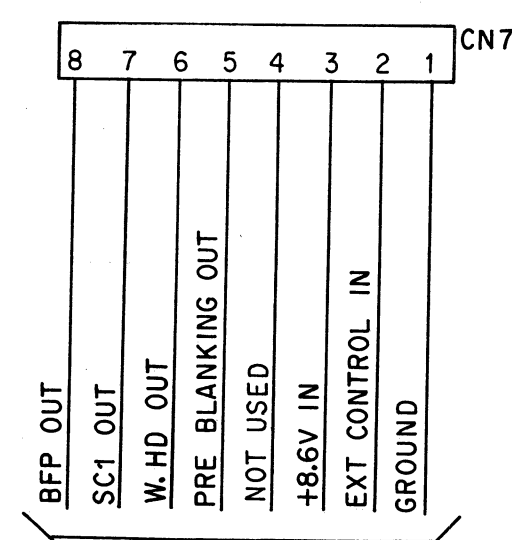
A



TO
MOTHER BOARD
---CN9



TO
MOTHER BOARD
---CN8



TO
MOTHER BOARD
---CN7



CONDUCTOR VIEW OF SYNC BOARD

SYNC BOARD (VIC1)

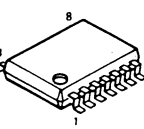
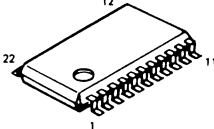
CT1 4.43MHz ADJ

SYNC Board

IC1	MN6160PBS	B4, C4
IC2	MN74HC4050S	C3
IC3	MN74HC221S	B2, C2
IC4	MN74HC107S	C1
IC5	MB84066BF	B3, C3
IC6	MN74HC221S	C1
IC7	MB84066BF	C3
IC8	MN74HC4049S	B1
Q1	2SC2412K7QRS (BR)	B4
Q2	2SC2412K7QRS (BR)	C4
Q3	2SC2412K7QRS (BR)	C1
Q4	2SC2412K7QRS (BR)	B2
Q5	2SA1037K7QRS (FR)	B2
Q6	2SC2412K7QRS (BR)	C2
Q7	2SA1037K7QRS (FR)	B2
Q8	2SC2404-CD (U)	B1
Q9	2SC2412K7QRS (BR)	C1
Q10	2SC2412K7QRS (BR)	B2
Q11	2SC2412K7QRS (BR)	B1
Q12	2SC2412K7QRS (BR)	B3
D1	MA328	B4
D2	MA328	B4
D3	DAN202KT7 (N)	C1

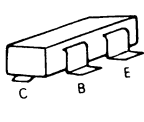
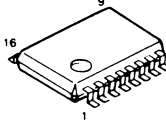
MN6160PBS

MN74HC107S
MB84066BF



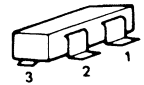
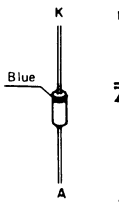
MN74HC4050S
MN74HC221S
MN74HC4049S

2SA1037K7QRS
2SC2412K7QRS

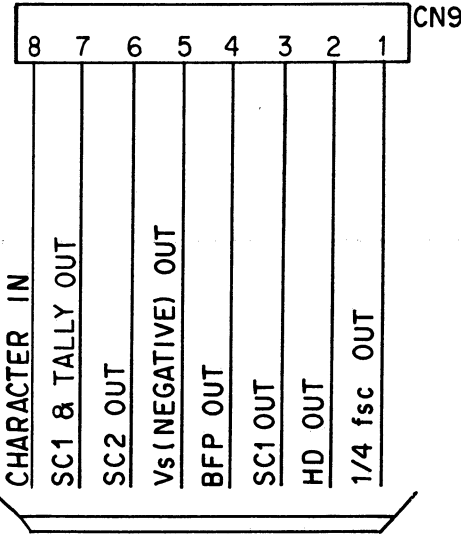


MA328

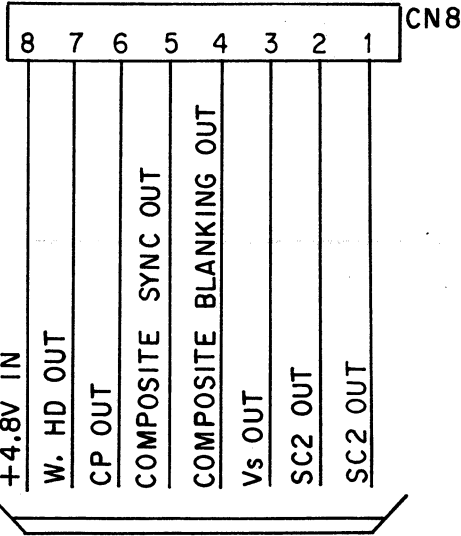
DAN202KT7



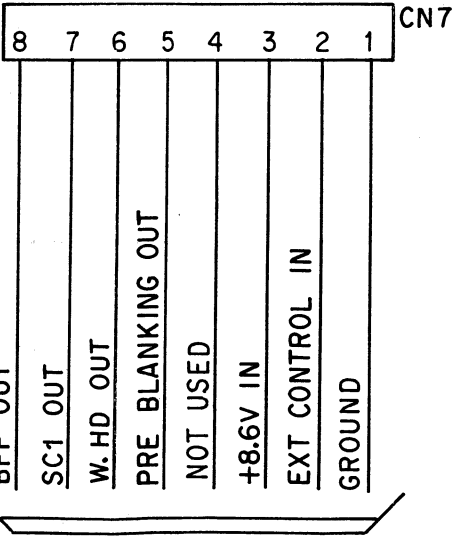
1 : Anode
2 : Anode
3 : Cathode



TO
MOTHER BOARD
---CN9



TO
MOTHER BOARD
---CN8



TO
MOTHER BOARD
---CN7

COMPONENT SIDE
PATTERN SIDE

CONDUCTOR VIEW OF AUDIO BOARD

Audio Board		
IC1	NJM4558MD	B5
IC2	SC49069	A6, B6
IC3	NJM2903M	A6
Q1	2SC2412K7QRS (BR)	B4
Q2	2SC2412K7QRS (BR)	A4
Q3	2SD602-QRS (W)	A3
Q4	2SB710-QRS (C)	A3
Q5	2SA1037K7QRS (FR)	A3
Q6	2SC2412K7QRS (BR)	B5
Q7	2SC2412K7QRS (BR)	A6
Q8	2SC2412K7QRS (BR)	A6
Q9	2SC2412K7QRS (BR)	A7
Q10	2SA1037K7QRS (FR)	B3
Q11	2SA1037K7QRS (FR)	C4
Q12	2SC2412K7QRS (BR)	B4
Q13	2SA1037K7QRS (FR)	B3
Q14	2SA1037K7QRS (FR)	B3
D1	MA157	A3
D2	MA151K (MH)	A4
D3	MA151K (MH)	B6
D5	MA151K (MH)	B4
D6	DA106K (Z)	A4

LED Board

D7	LN11WP23F	D4
----	-----------	----

NJM2903M
NJM4558M

SC49069

2SB710-QRS
2SD602-QRS
2SA1037K7QRS
2SC2412K7QRS

MA151K

1: NC
2: Anode
3: Cathode

MA157

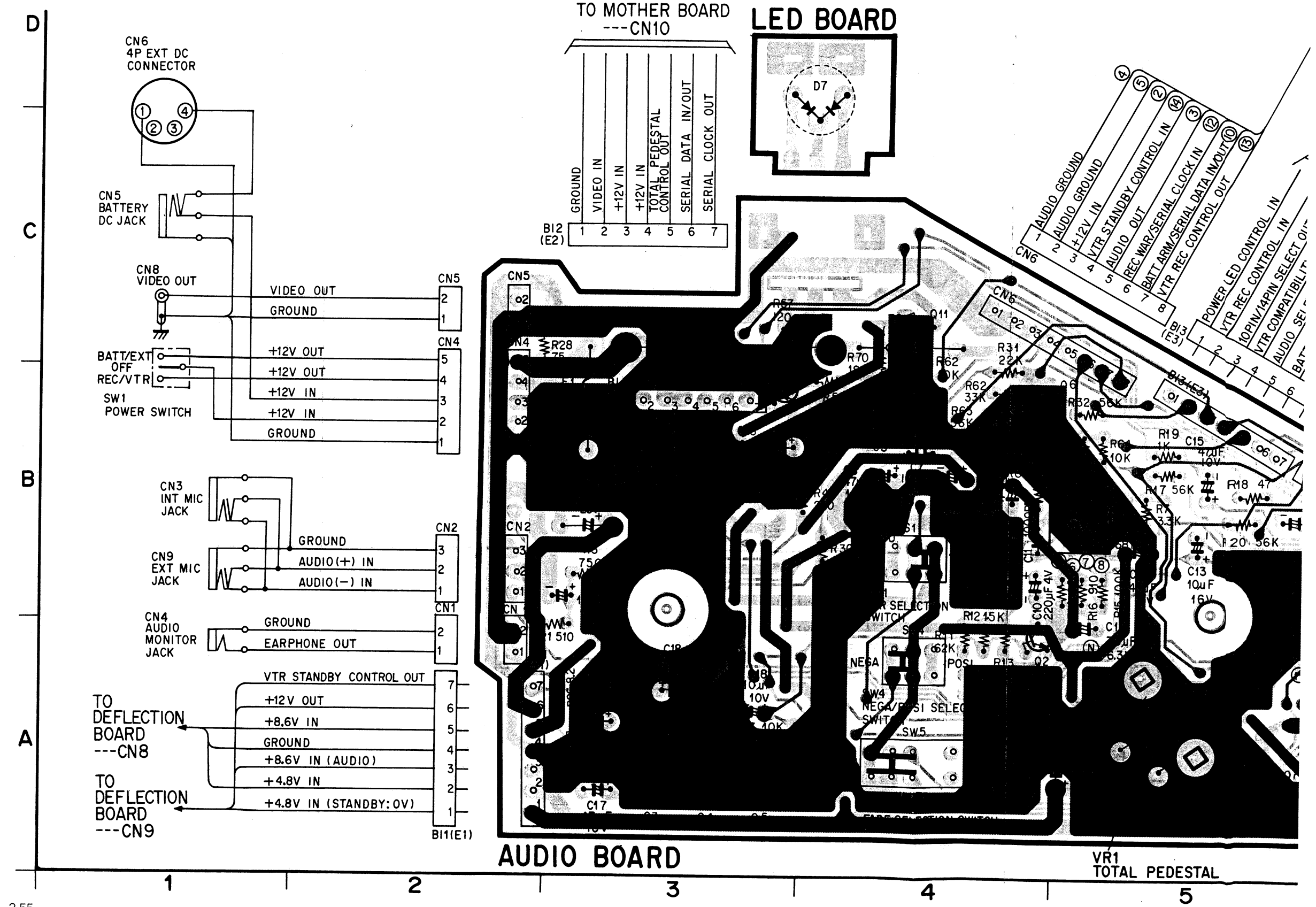
DA106K

1: NC
2: Cathode
3: Anode

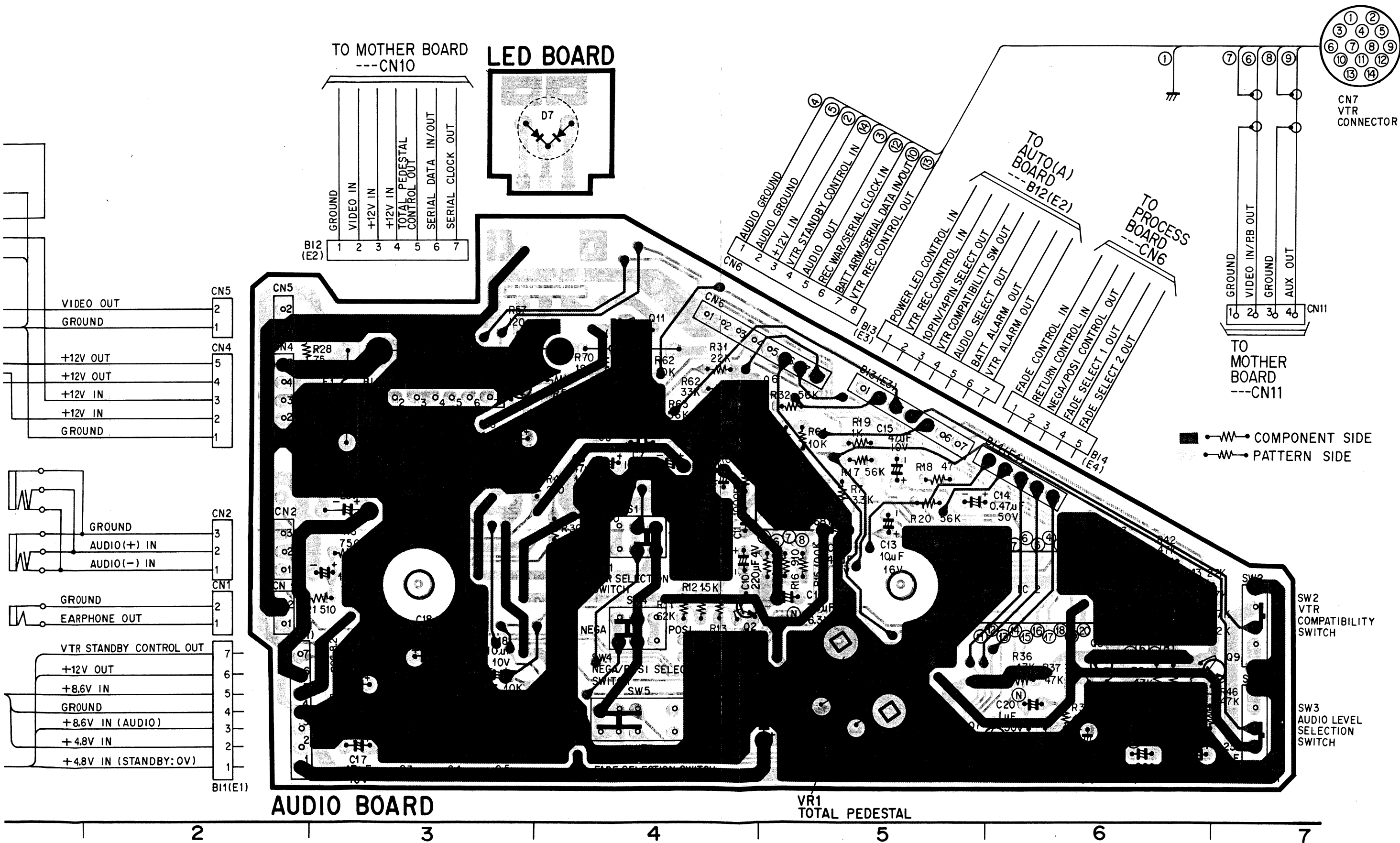
1: Anode
2: NC
3: Cathode

LN11WP23F

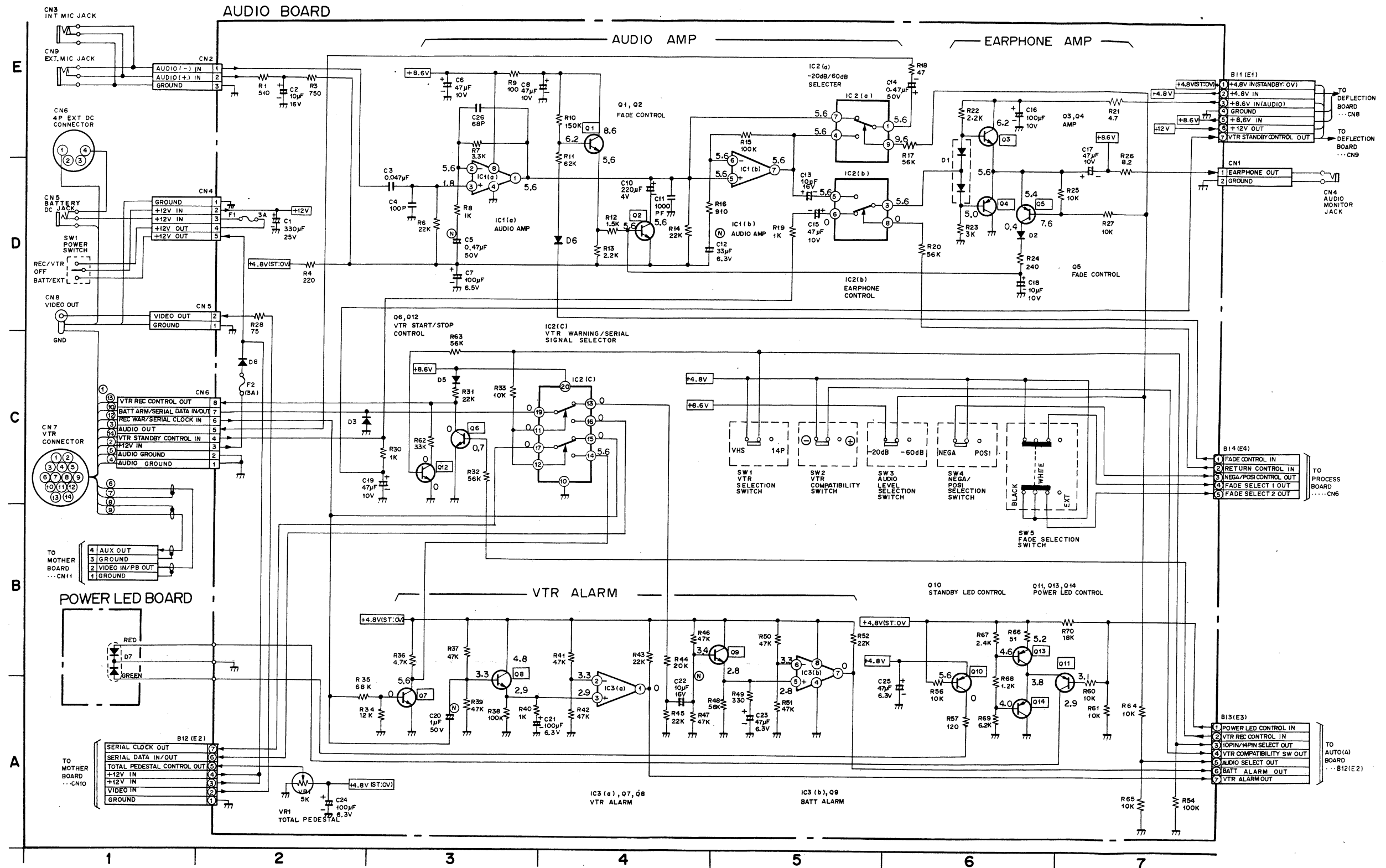
1 2 3
A K A



CONDUCTOR VIEW OF AUDIO BOARD



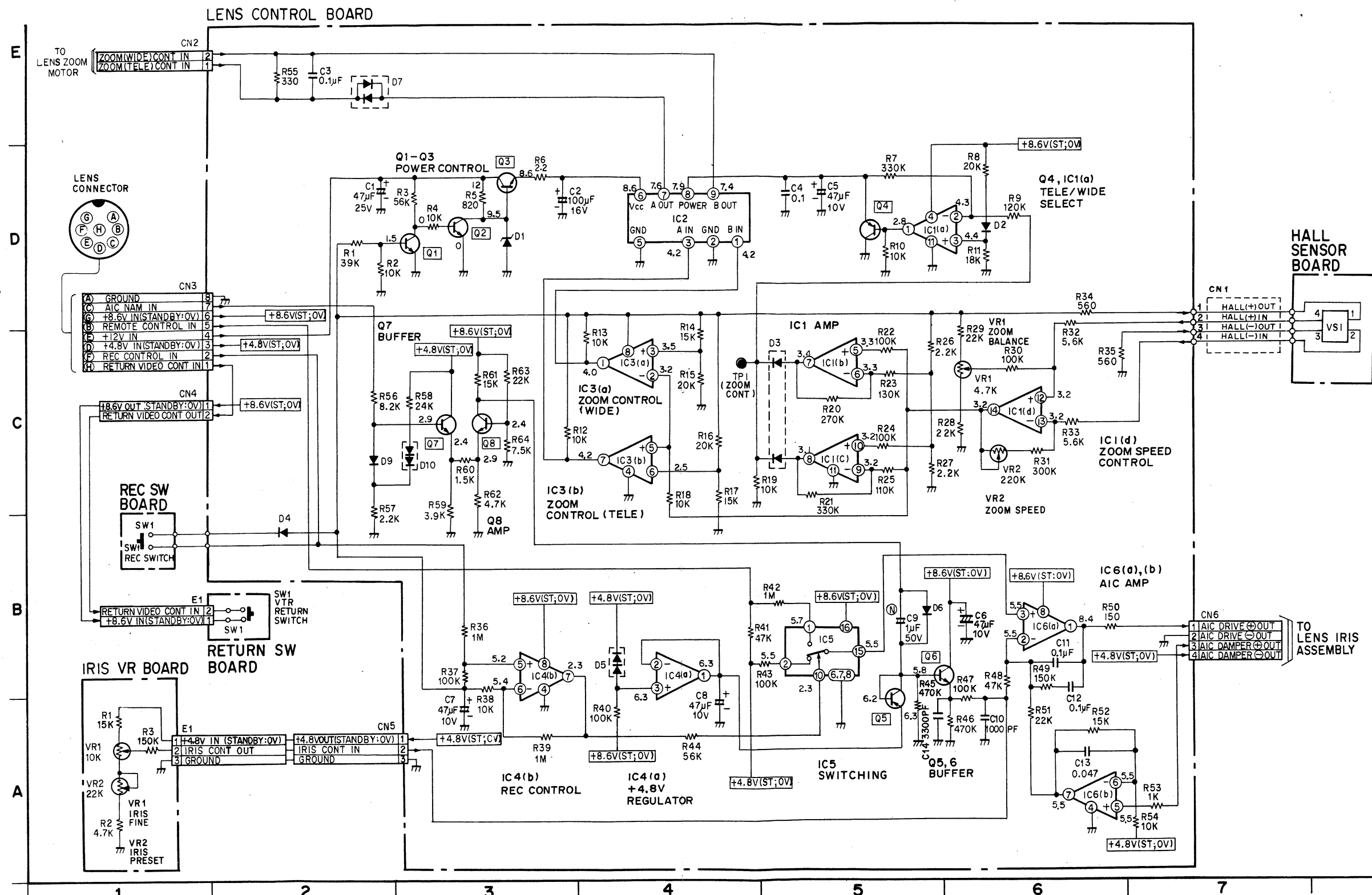
SCHEMATIC DIAGRAM OF AUDIO BOARD



Audio Board			
IC1	NJM4558MD	D3, D5	Q6
IC2	SC49069	D5, E5, C4	Q7
IC3	NJM2903M	A4, A5	Q8
Q1	2SC2412K7QRS (BR)	E4	Q9
Q2	2SC2412K7QRS (BR)	D4	Q10
Q3	2SD602-QRS (W)	E6	Q11
Q4	2SB710-QRS (C)	D6	Q12
Q5	2SA1037K7QRS (FR)	D6	Q13
			Q14

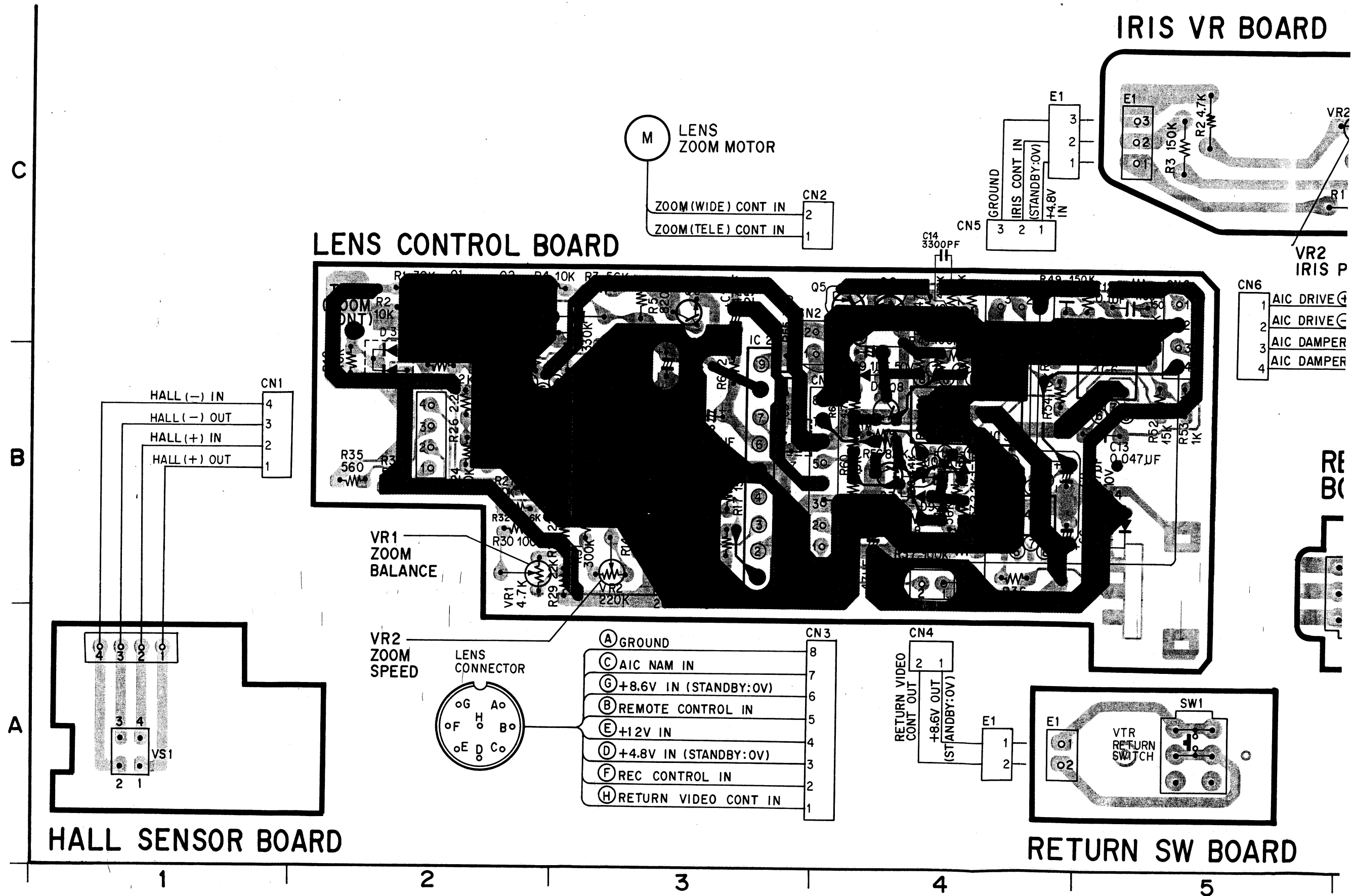
LED Board			
Q14	2SA1037K7QRS (FR)	A6	D7
D1	MA157	D6	
D2	MA151K (MH)	D6	
D3	MA151K (MH)	C2	
D5	MA151K (MH)	C3	
D6	DA106K (Z)	D4	

SCHEMATIC DIAGRAM OF LENS CONTROL BOARD



IC1	NJM2902M	C5, C6, D5	Q4	2SB710-QRS	(C)	D5	D1	MA4091-H	D3
IC2	BA6218	D4	Q5	2SB709-QRS	(A)	B5	D2	MA151K	D6
IC3	NJM2903M	C4	Q6	2SD601-QRS	(Y)	B6	D3	MA151WK	(MT) C5
IC4	NJM4558M	B3, B4	Q7	2SD601-QRS	(Y)	C3	D4	MA151K	(MH) B2
IC5	NJU4053BM	B5	Q8	2SD601-QRS	(Y)	C3	D5	MA157	B4
IC6	NJM3414M	A6, B6					D6	MA151K	(MH) B5
Q1	2SC2412K7QRS (BR)	D3					D7	MA157	C3
Q2	2SC2412K7QRS (BR)	D3					D9	MA151K	(MH) C2
Q3	2SC1383-PQ	D3					D10	MA157	C3

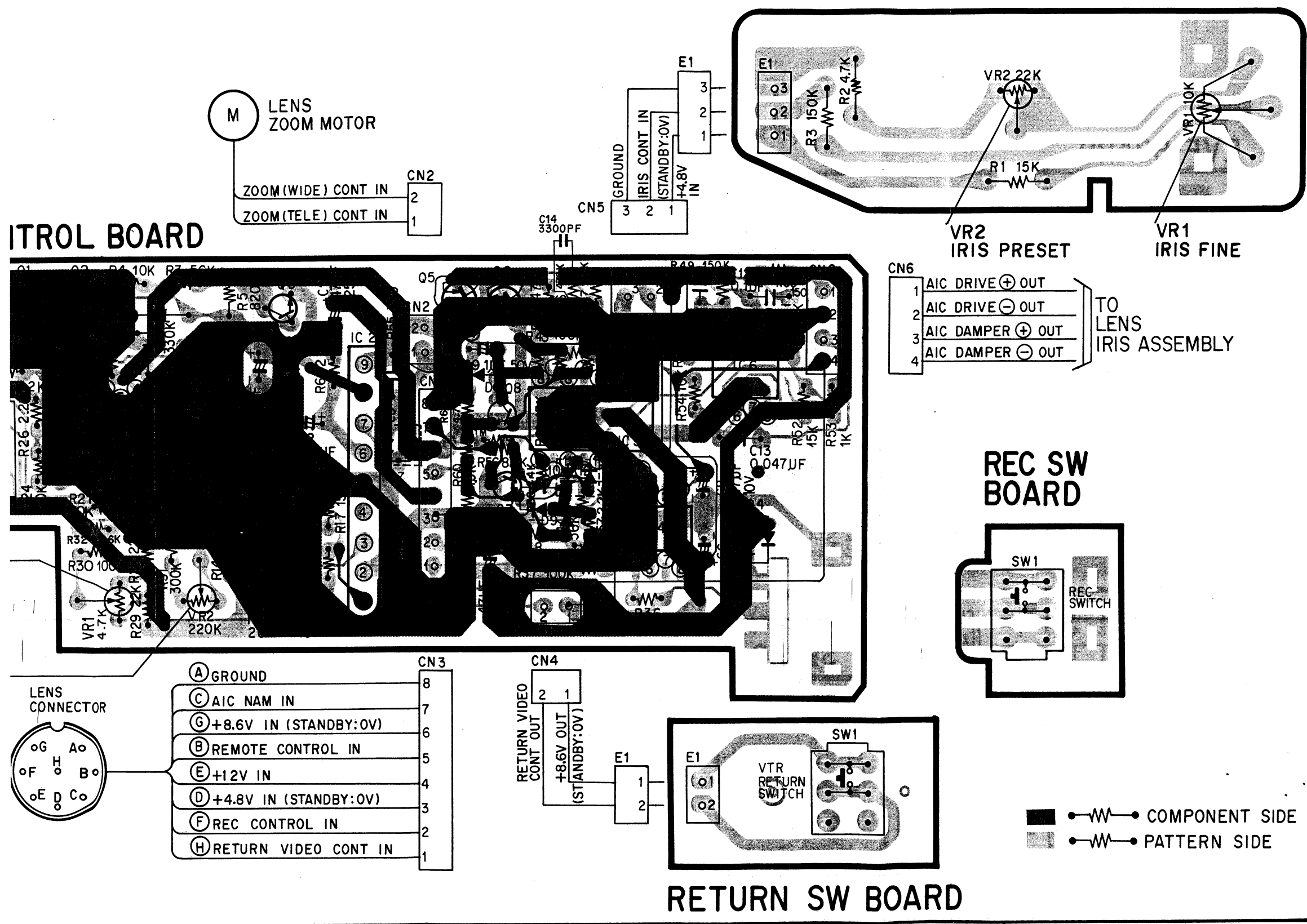
CONDUCTOR VIEW OF LENS CONTROL BOARD



CONDUCTOR VIEW OF LENS CONTROL BOARD

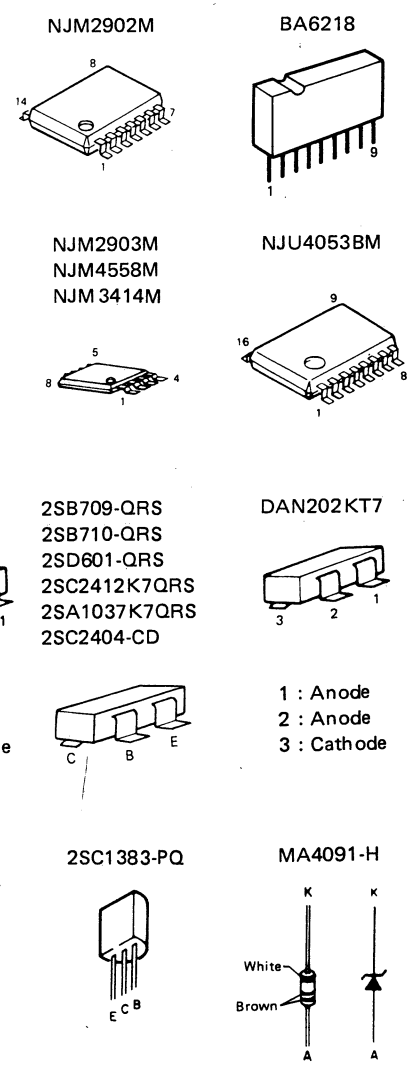
IRIS VR BOARD

ITROL BOARD

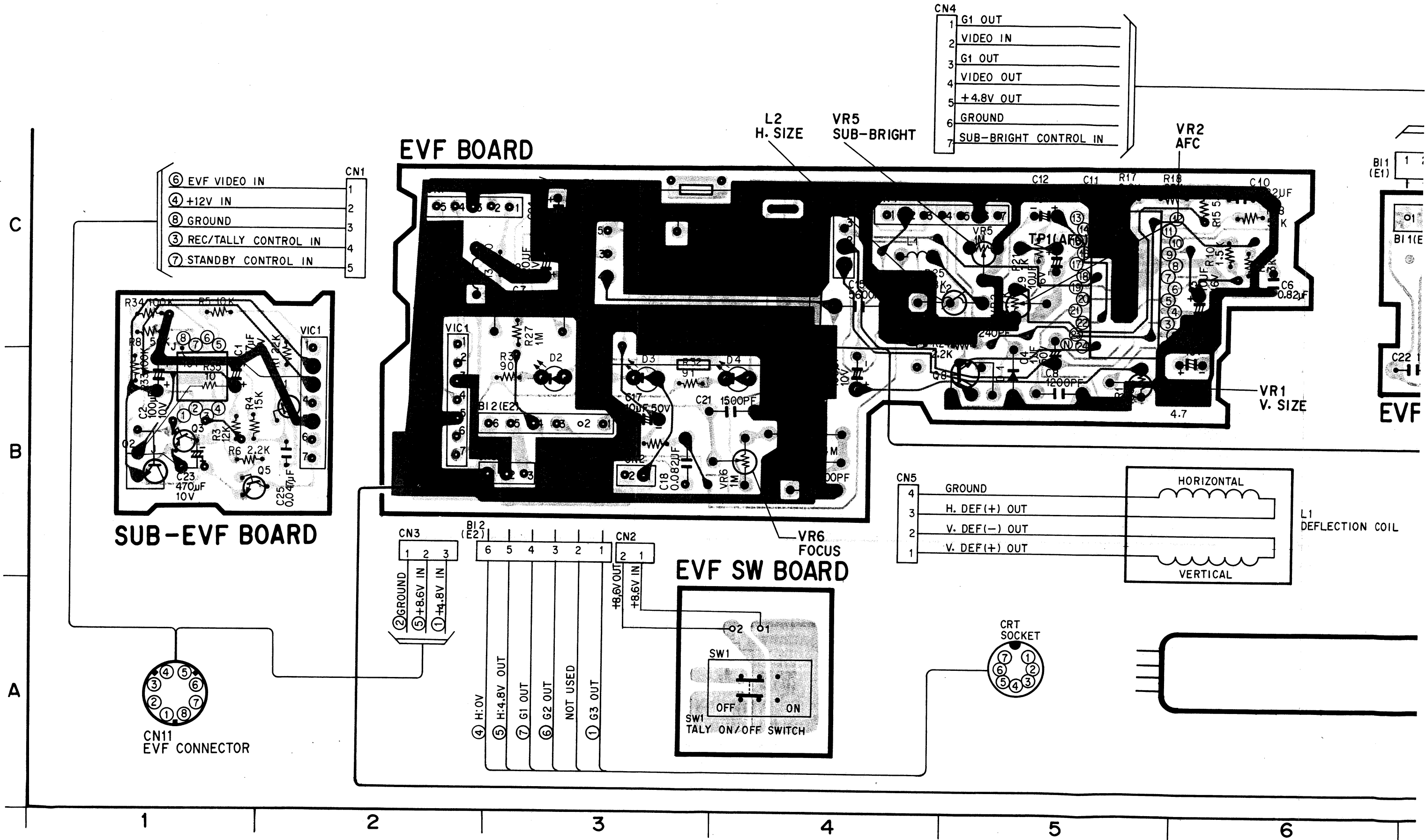


Lens Control Board

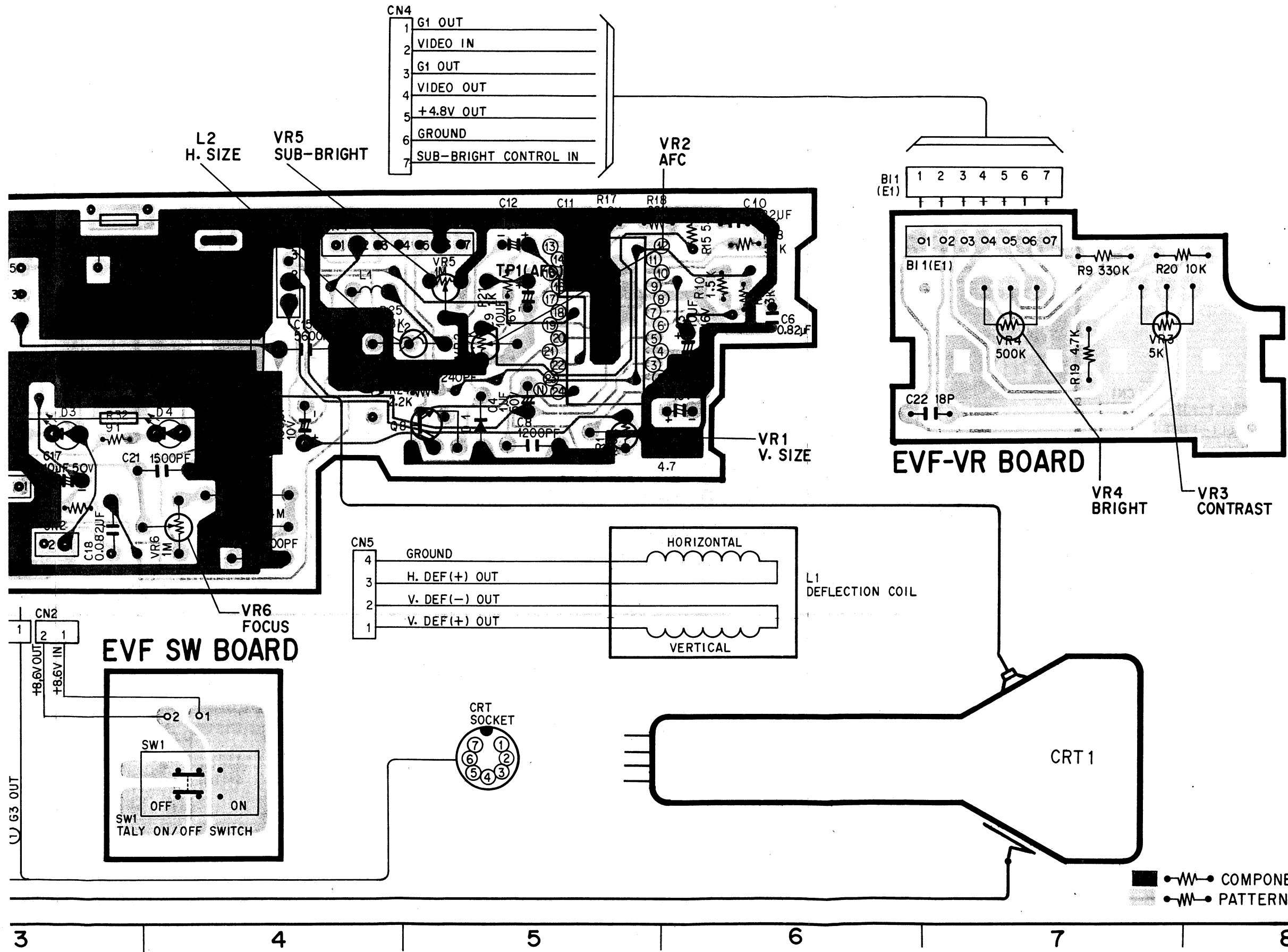
IC1	NJM2902M	B2, B3
IC2	BA6218	B3
IC3	NJM2903M	B3
IC4	NJM4558M	B4
IC5	NJU4053BM	B4
IC6	NJM3414M	B5
Q1	2SC2412K7QRS (BR)	C2
Q2	2SC2412K7QRS (BR)	C2
Q3	2SC1383-PQ	C3
Q4	2SB710-QRS (C)	B3
Q5	2SB709-QRS (A)	C4
Q6	2SD601-QRS (Y)	C4
Q7	2SD601-QRS (Y)	B4
Q8	2SD601-QRS (Y)	B4
D1	MA4091-H	C3
D2	MA151K	B3
D3	MA151WK (MT)	B2
D4	MA151K (MH)	B5
D5	MA157	B4
D6	MA151K (MH)	B4
D7	MA157	B3
D9	MA151K (MH)	B4
D10	MA157	B4



CONDUCTOR VIEW OF EVF WV-VF33



CONDUCTOR VIEW OF EVF WV-VF33

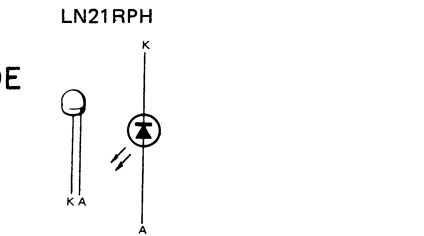
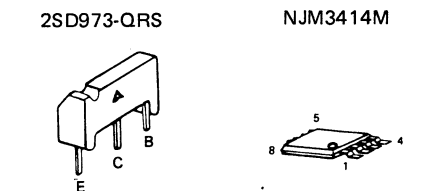
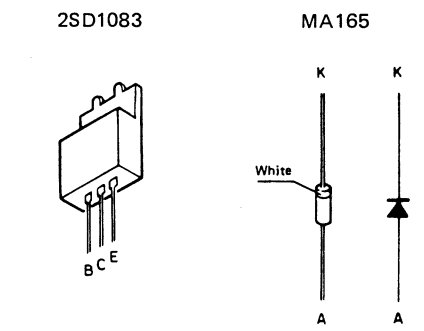
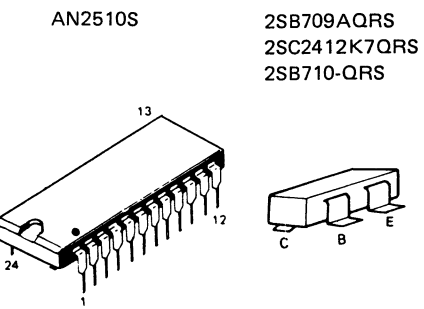


SUB-EVF Board

IC1	NJM3414M	B1
Q1	2SC2412K7QRS	B2
Q2	2SD973-QRS	B1
Q3	2SB710-QRS	(C) B1
Q5	2SD602-QRS	(W) B1

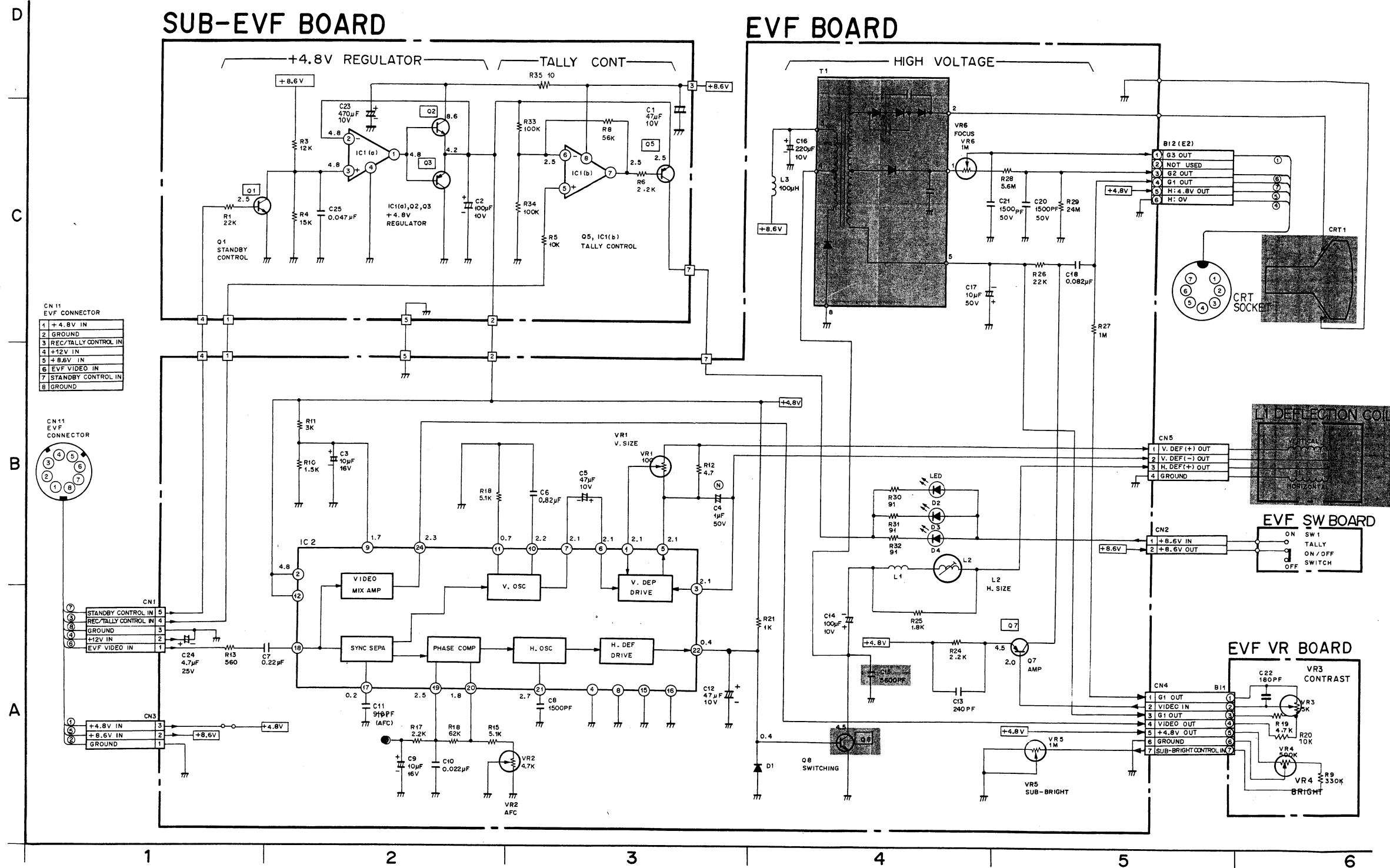
EVF Board

IC2	AN2510S	C5
Q7	2SB709AQRS	(B) C4
Q8	2SD1083	B5
D1	MA165	B5
D2	LN21RPH	B3
D3	LN21RPH	B3
D4	LN21RPH	B4



COMPONENT SIDE
PATTERN SIDE

SCHEMATIC DIAGRAM OF EVF WV-VF33



EVF Board

IC2	AN2510S	A2, A3
Q7	2SB709AQRS (B)	A5
Q8	2SD1083	A4
D1	MA165	A4
D2	LN21RPH	B4
D3	LN21RPH	B4
D4	LN21RPH	B4

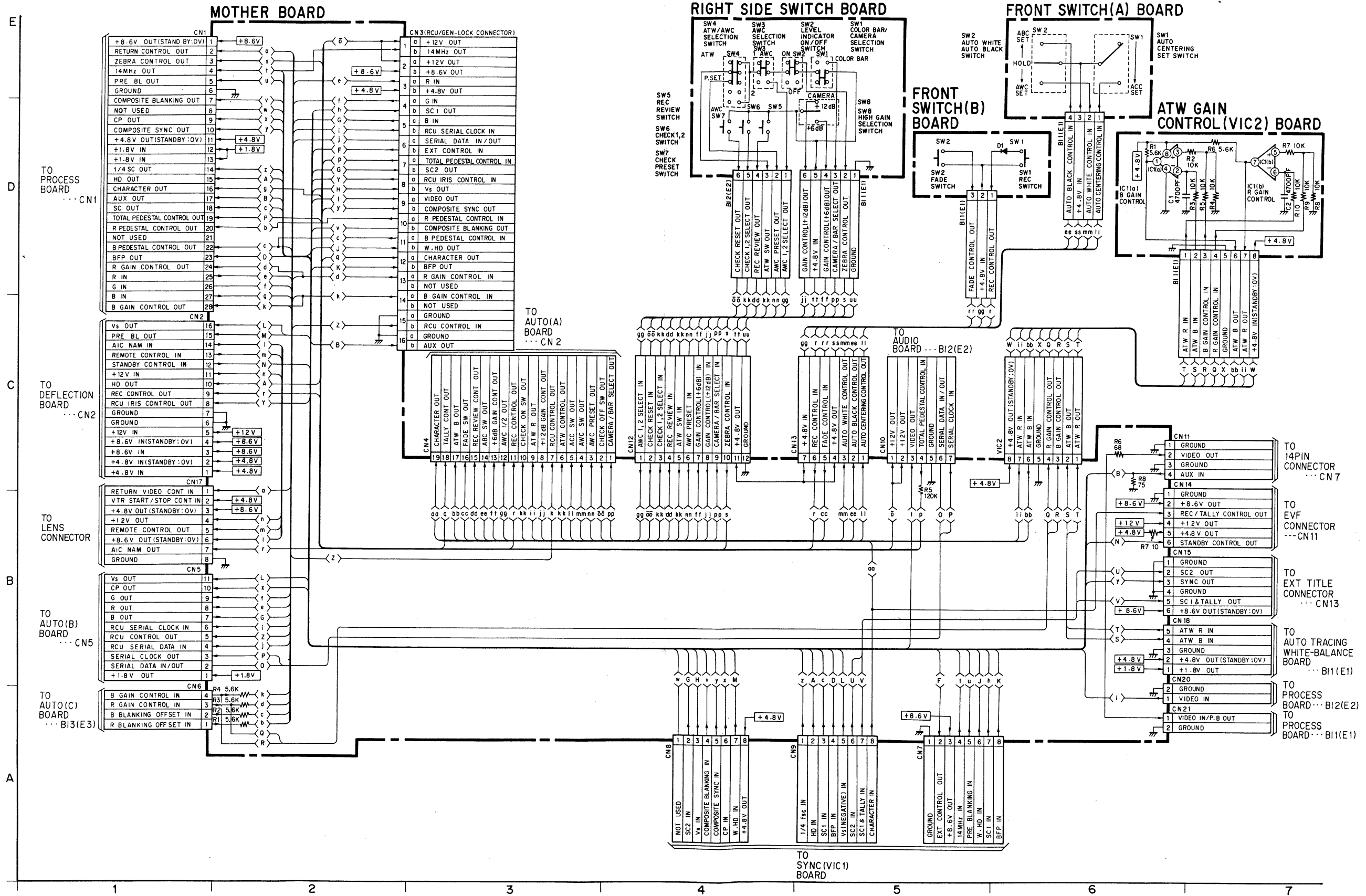
SUB-EVF Board

IC1	NJM3414M	C2, C3
Q1	2SC2412K7QRS	C1
Q2	2SD973-QRS	C2
Q3	2SB710-QRS (C)	C2
Q5	2SD602-QRS (W)	C3

PRODUCT SAFETY NOTE

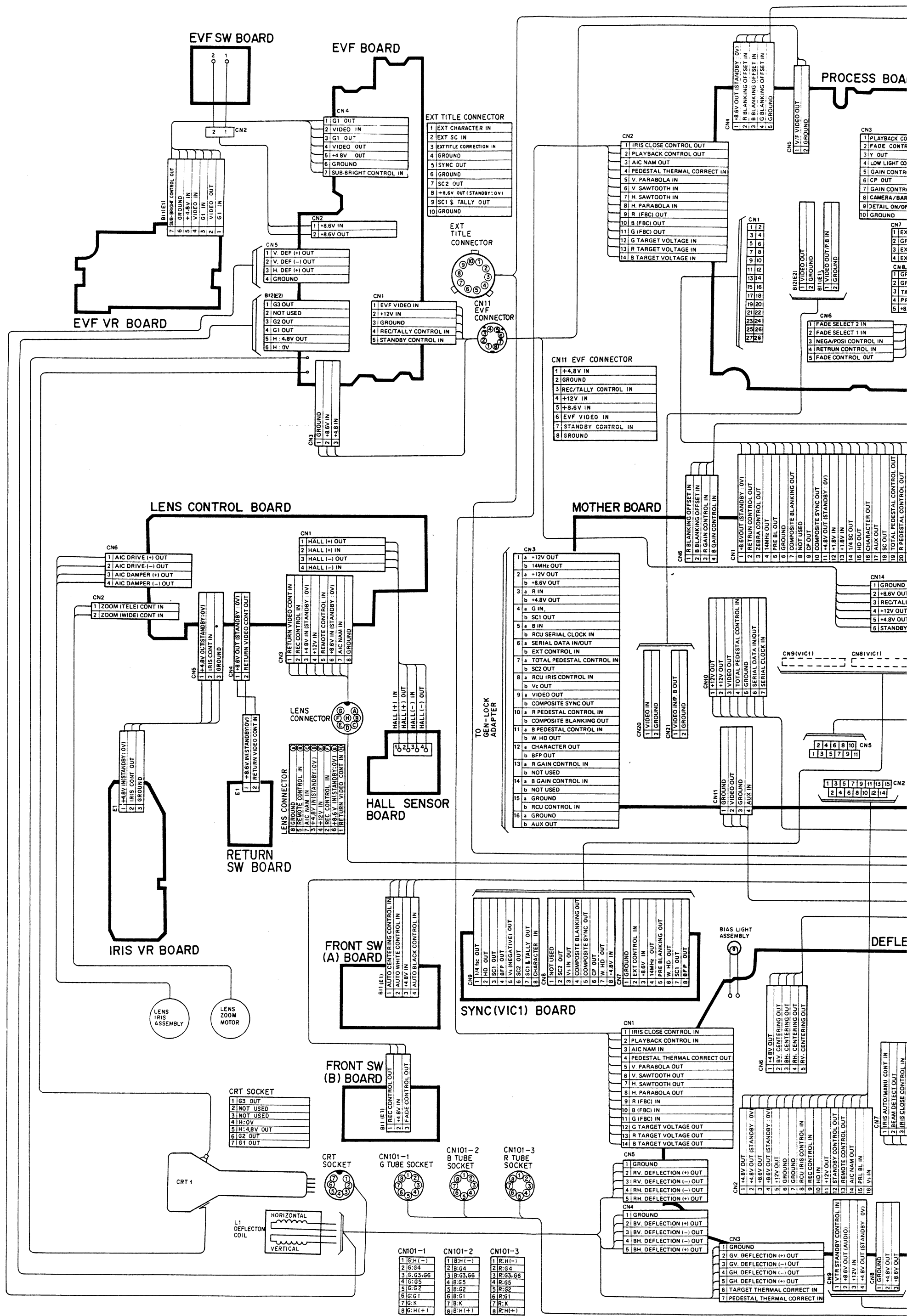
The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

SCHEMATIC DIAGRAM OF MOTHER BOARD

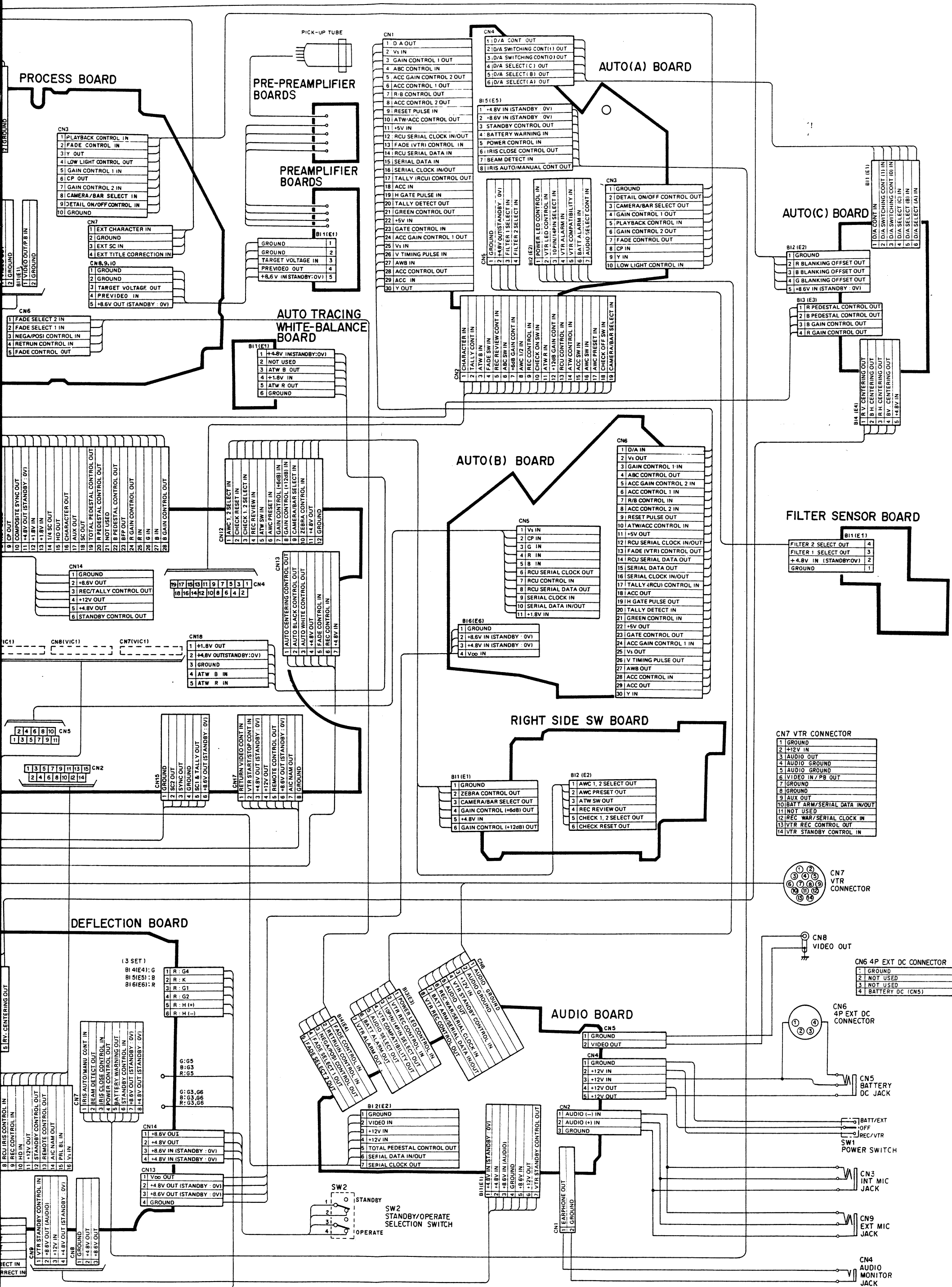


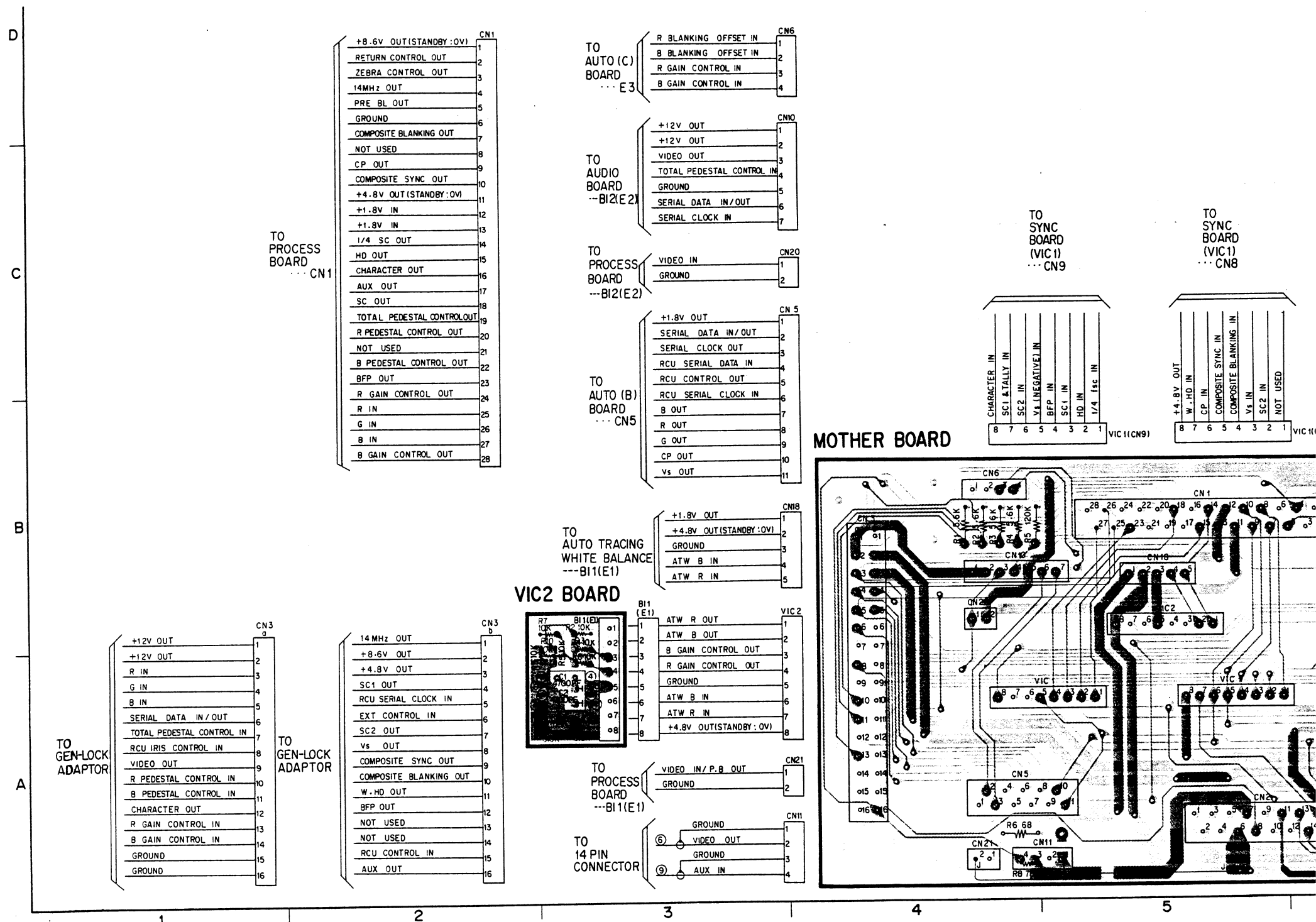
ATW Gain Control Board

D1 MA165 D6 IC1 NJM3414M D7
3-70



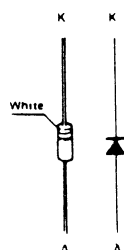
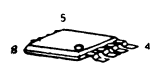
WIRING DIAGRAM





NJM3414M

MA165



Front SW (B) Board

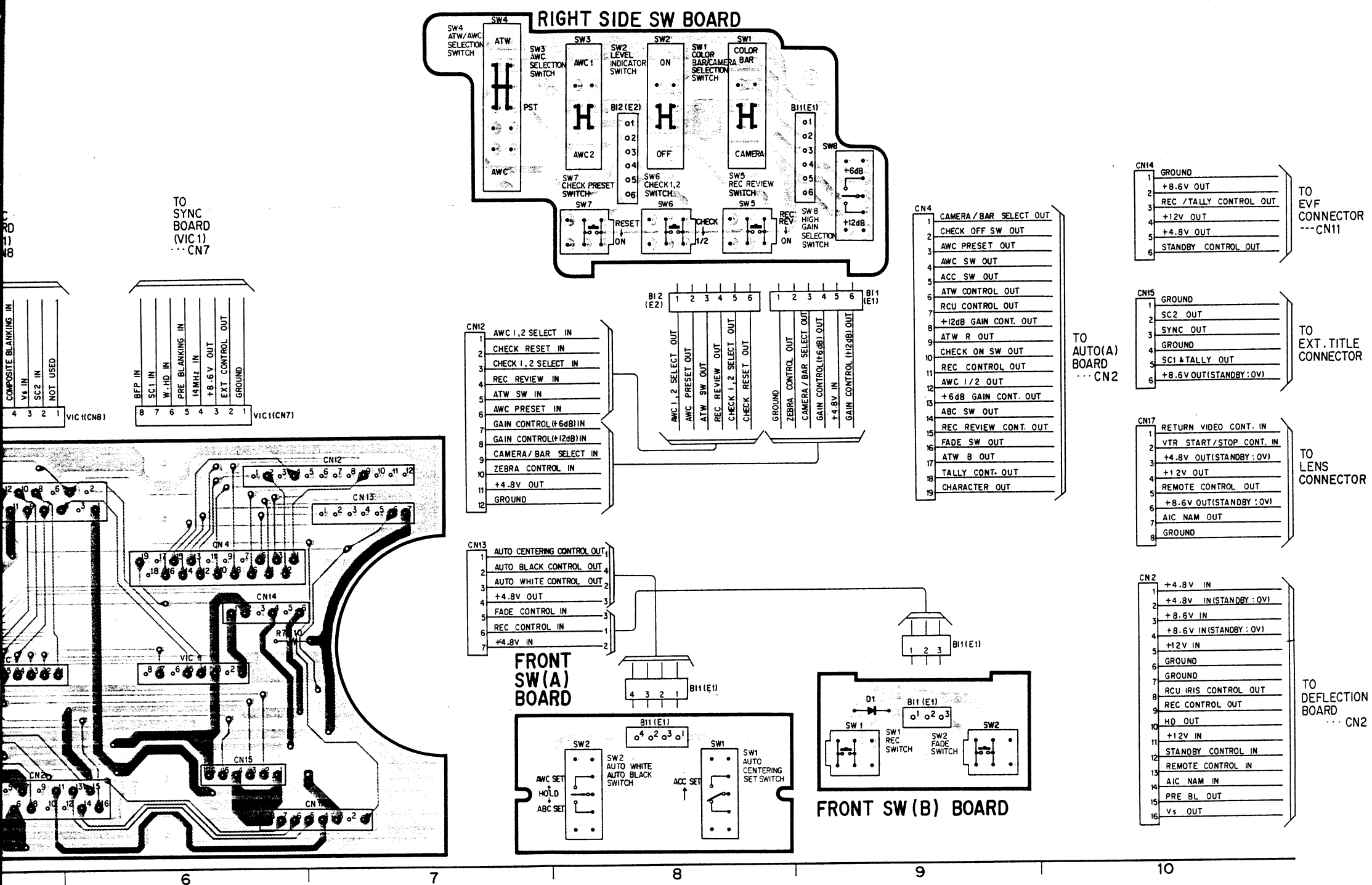
ATW Gain Control Board

MA165

IC1

NJM3414M

A3



●—W—● COMPONENT SIDE
●—W—● PATTERN SIDE

Service Manual

Colour Video Camera

Vol. 4

WV-V3 Series

Replacement Parts List
Exploded View

CONTENTS

PARTS LIST

Miscellaneous	4-1~4-2
Selection Switch Board.	4-2
Audio Board.	4-2~4-3
LED Board.	4-3
Front Switch (A) Board	4-3
Front Switch (B) Board	4-3
Pre-pre Amplifier Board.	4-3
Pre Amplifier Board	4-3
Filter Sensor Board.	4-3
Process Board	4-4~4-7
Process VIC 1 Board	4-7~4-8
Process VIC 2 Board	4-8
Process VIC 3 Board	4-8~4-9
Process VIC 4 Board	4-9
Process VIC 5	4-10
Process VIC 6	4-10
Process VIC 7	4-10
Process VIC 8	4-10
Process VIC 9	4-11
Process VIC 10	4-11
Process VIC 11	4-11
Process VIC 12	4-11~4-12
Process VIC13,14	4-12
Deflection Board	4-12~4-15
Deflection VIC Board	4-15
Capacitor Board.	4-16

Auto A Board	4-16
Auto B Board	4-16~4-18
Auto C Board	4-18
Mother Board	4-18
Sync Board	4-18~4-19
Lens Control Board.	4-19
Zoom Switch Board	4-20
REC Switch Board	4-20
Iris VR Board	4-20
Return Board	4-20
ATW Board	4-20
1.5" EVF	
Miscellaneous	4-20
EVF Board.	4-21
EVF Tally Switch Board.	4-21
EVF VR Board	4-21
Microphone	4-21
Zoom Lens	4-21
Accessory Parts/Packaging Parts.	4-22

EXPLODED VIEW

Camera	4-23
1.5" EVF	4-24
Microphone	4-24
Zoom Lens.	4-24
Packaging	4-25

Important Notice

REPLACEMENT PARTS LIST

- Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
- Components identified by $\circ$ mark are new parts used from this model.
- Complete printed circuit board assembly is not available as replacement part.

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
COLOR VIDEO CAMERA			M34	YWA620AER01	Insulator Washer
MISCELLANEOUS			M35	$\circ$ YFV2PA0101A4	Insulator Sheet for Left Side Cover
V1-3	$\circ$ S4701A	Pick-up Tube	M36	$\circ$ YFV2TB0066B3	Mic Holder A
L1	$\circ$ YFELY13A303B	Deflection Coil Assy (G)	M37	$\circ$ YFV5VA0038A3	Mic Pad (x2)
L2, 3	$\circ$ YFELY13A303C	Deflection Coil Assy (R/B)	M38	$\circ$ YFV2TA0067A3	Mic Holder B
SW1	$\circ$ YFE-2013	Power Switch	M39	$\circ$ YFV1FA0021B4	Mounting Nut (x2)
SW2	YFE-2022	Standby/Operate Selection Switch	M41	$\circ$ YFV6AA0012A2	Handle Cover
SO1	YFTCB-S2	ATW Sensor Assy	M42	$\circ$ YFV6AA0013B2	Handle
CN1-1	S8-622J-607	Vidicon Socket Assy(G)	M43	$\circ$ YFV2SA0199A4	Mounting Angle B for ATW Board
CN1-2,1-3	S8-622J-604	Vidicon Socket Assy(R/B)	M44	YWCC704FM02	Special Screw for Shoe
CN2	YFV3LENSCA	Lens Cable Assy	M45	YWCC704WM07	Spring for Shoe
CN3, 4	YW-SJ296	Internal Mic/Audio Monitor Jack	M46	$\circ$ YFV5MA0002B4	Shoe
CN5	YWQMA1221B	Battery DC Jack	M47	$\circ$ YFV5EA0326A3	ATW Cover
CN6	YFXLR432F512	4 pin EXT DC Connector	M48	$\circ$ YFV2SA0198A4	Mounting Angle C for ATW Sensor
CN7	$\circ$ YFVEE014SA	14 pin VTR Connector	M49	$\circ$ YFV2CA0091A4	Coil Stopper Angle
CN8	YWBNC-R	Video Output Connector	M50	$\circ$ YFV4JA0100A4	Coil Stopper Spring
CN9	YWLJ145-1A	EXT Mic Jack	M51	$\circ$ YFV1HA0011A4	Coil Stopper Pin
CN11	YFEVFCNV3	8 pin EVF Connector	M52	$\circ$ YFV4JA0101A4	Slide Spring Plate
CN12	YFR038F3	Lens Connector	M53	$\circ$ YFV2CA0090A4	Slide Mounting Base
CN13	D0-111N-604	Title Connector	M54	$\circ$ YFV2EA0033A4	Slide Guide Base
M1	$\circ$ YFTV406A-2	Optical Mechanism	M55	$\circ$ YFV1EA0048A4	Lock Screw
M2	$\circ$ YFV2NA0051A4	Mounting Plate for Filter Sensor	M56	$\circ$ YFV4RA0012A4	Lock Lever
M3	$\circ$ YFV2HA0281A4	Shield Cover A	M57	$\circ$ YFV5MA0019A4	EVF Mounting Shoe
M4	$\circ$ YFV1HA0017A4	Adjust Pin for EVF	M58	$\circ$ YFV4JA0102A4	EVF Spring for Shoe
M5	$\circ$ YFVAKA0423AN	Filter Wheel Assy	M61	$\circ$ YFV5EA0319B1	Upper Cover
M6	$\circ$ YFV5EA0324B1	Front Cover Assy	M62	$\circ$ YFV2SA0203A4	Mounting Angle D for Auto Sub Board
M7	$\circ$ YFV2NA0052A4	Filter Guide Spacer Pin	M63	$\circ$ YFV2EA0320B1	Rear Cover
M8	$\circ$ YFV2NA0053A4	Filter Guide Washer A	M64	$\circ$ YFV2EB0028B4	Mounting Guide for Battery
M9	$\circ$ YFV1KA0030A4	Filter Guide Washer B	M65	$\circ$ YFV5EA0323A4	Connector Cover
M10	$\circ$ YFV2SA0210A4	Mounting Angle A for Lens Connector	M67	$\circ$ YFV5EA0318B1	Bottom Cover
M11	$\circ$ YFV2SA0205A4	Mounting Angle B for Front Switch Board A	M68	$\circ$ YFV2SA0206A4	Mounting Angle E for Right Side Switch Board
M12	YFV6JA0026A4	Push Knob A for AF	M69	$\circ$ YFV5EA0333A4	Bottom Vidicon Cover
M13	$\circ$ YFV4JA0103A4	Spring Switch	M70	$\circ$ YFV2EA0021A3	Hinge (x4)
M15	$\circ$ YFV9AA0275AN	Bayonet Mounting Assy	M71	$\circ$ YFV5RA0061A4	Push Knob D for REC
M16	$\circ$ YFV5EB0321B1	Right Side Cover	M72	$\circ$ YFV5RA0065A4	Slide Knob E for BC
M17	$\circ$ YFV5VA0039A4	Face Pad	M73	$\circ$ YFV5RA0062A4	Slide Knob F for WB
M18	$\circ$ YFV5EB0322A4	Filter Cover	M75	$\circ$ YFV2HA0319A4	Shield Case A for Coil
M19	$\circ$ YFV2FA0105A4	Cushion for Filter Cover	M76	$\circ$ YFV2HA0320A4	Shield Case B for Coil
M20	$\circ$ YFV4JA0106A4	Spring for Filter Cover	M77	YFV2NA0066A4	Spacer Screw for Auto Board
M21	$\circ$ YFV1HA0019A4	Stopper Pin	M78	$\circ$ YFV2HA0317A4	Shield Plate A for Auto A Board
M22	XPL16A8WV	Pin	M79	$\circ$ YFV2HA0318A4	Shield Plate B for Auto B Board
M23	$\circ$ YFV4JA0105A4	Mounting Spring for Right Side Cover	M80	$\circ$ YFV5VA0039A2	Shoulder Pad
M24	$\circ$ YFV1EA0036A4	Mounting Screw for Right Side Cover	M81	$\circ$ YFV2PA0106A3	Insulator Sheet A for Right Side Cover
M25	$\circ$ YFV7SA0184B5	Filter Change Label	M82	$\circ$ YFV2PA0107A3	Insulator Sheet B for Left Side Cover
M26	$\circ$ YFV5EB0325B1	Left Side Cover	M84	$\circ$ 2X22SUS303	Pin
M27	$\circ$ YFV5DB0026A2	Decoration Plate	M85	$\circ$ YFV5JA0010A1	Grip Case
M28	$\circ$ YFV5EA0341A4	Blank Panel	M86	$\circ$ YFV2SA0196A4	Zoom Mounting Angle
M30	$\circ$ YFV2SA0200A4	Mounting Angle A for DC Jack	M87	$\circ$ YFV5EA0327A3	Zoom B/C Cover
M31	$\circ$ YFV5RA0063A4	Switch Knob B	M88	YFV4JA0099A4	Zoom Spring
M32	$\circ$ YFV2TA0068A4	Mounting Plate for BNC Connector	M89	$\circ$ YFV6JA0026A4	Knob G for FA
M33	$\circ$ YFV5RA0064A4	VR Knob C			

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
M90	o YFV2SA0195A4	Zoom Magnet	R14	YF2116223JT	Carbon 22K ohms 1/16W
M91	o YFV5KA0065A3	Zoom Case	R15	YF2116104JT	Carbon 100K ohms 1/16W
M92	o YFV2SA0195A4	Mounting Angle F For Iris Switch	R16	YF2116911JT	Carbon 910 ohms 1/16W
M93	o YFV5RA0048A4	VR Knob H	R17	YF2116563JT	Carbon 56K ohms 1/16W
M94	o YFV6JA0035A4	VTR Knob I	R18	YF2116470JT	Carbon 47 ohms 1/16W
M95	o YFV5JA0009A1	Grip Arm	R19	YF2116102GT	Carbon 1K ohms 1/16W
M96	o YFV5GA0034A4	Control Cap	R20	YF2116563JT	Carbon 56K ohms 1/16W
M97	o YFV5YA0020B3	Grip Band	R21	YF21164R7JT	Carbon 4.7 ohms 1/16W
M98	o YFV2SA0197A4	Mounting Angle G for VTR Switch	R22	YF2116222GT	Carbon 2.2K ohms 1/16W
M100	o YFV7PA0030A4	Panasonic Badge for WV-V3E, Series	R23	YF2116302JT	Carbon 3K ohms 1/16W
	o YFV7PA0032A4	National Badge for WV-V3N, WV-V3NA	R24	YF2116241JT	Carbon 240 ohms 1/16W
M101	o YFV7QA0854A4	Main Label for WV-V3E, WV-V3EG, WV-V3ES	R25	YF2116103JT	Carbon 10K ohms 1/16W
	o YFV7QB0854A4	Main Label for WV-V3EB	R26	YF21158R2JT	Carbon 8.2 ohms 1/16W
M102	o YFV7QA0856A4	Main Label for WV-V3N, WV-V3NA	R27	YF2116103JT	Carbon 10K ohms 1/16W
	o YFV7PA0031A4	Panasonic/V3 Badge for WV-V3E Series	R28	YF2116750JT	Carbon 75 ohms 1/16W
	o YFV7PA0033A4	National/3V Badge for WV-V3N Series	R30	YF2116102GT	Carbon 1K ohms 1/16W
M104	△ YFV7MA0099A4	UL Caution Label	R31	YF2116223JT	Carbon 22K ohms 1/16W
M105	△ YFV7MA0260A4	DC Connector Label	R32	YF2116563JT	Carbon 56K ohms 1/16W
M108-1-9	o YFV7QA0853B3	Decoration Label	R33	YF2116103JT	Carbon 10K ohms 1/16W
			R34	YF2116123JT	Carbon 12K ohms 1/16W
			R35	YF2116683GT	Carbon 68K ohms 1/16W
SELECTION SWITCH BOARD			R36	YF2116472JT	Carbon 4.7K ohms 1/16W
PCB1	o YFVKZ00V3P3A	Printed Circuit Board Assy	R37	YF2116473GT	Carbon 47K ohms 1/16W
SW1-3	YFSSY022L6N	Slide Switch	R38	YF2116104JT	Carbon 100K ohms 1/16W
SW4	YFSSY023L6N	Slide Switch	R39	YF2116473GT	Carbon 47K ohms 1/16W
SW5-7	YFSPH222A	Push Switch	R40	YF2116102GT	Carbon 1K ohms 1/16W
SW8	YFA-13HB	Toggle Switch	R41,42	YF2116473GT	Carbon 47K ohms 1/16W
			R43	YF2116223JT	Carbon 22K ohms 1/16W
			R44	YF2116203JT	Carbon 20K ohms 1/16W
			R45	YF2116223JT	Carbon 22K ohms 1/16W
			R46,47	YF2116473GT	Carbon 47K ohms 1/16W
AUDIO BOARD			R48	YF2116563JT	Carbon 56K ohms 1/16W
PCB2	o YFVKB00V3P3A	Printed Circuit Board Assy	R49	YF2116331JT	Carbon 330 ohms 1/16W
IC1	NJM4558MD	IC	R50,51	YF2116473GT	Carbon 47K ohms 1/16W
IC2	SC49069	IC	R52	YF2116223JT	Carbon 22K ohms 1/16W
IC3	NJM2903M	IC	R54	YF2116104JT	Carbon 100K ohms 1/16W
Q1,2	2SC2412K7QRS	Transistor	R56	YF2116103JT	Carbon 10K ohms 1/16W
Q3	2SD602-QRS	Transistor	R57	YF2116121JT	Carbon 120 ohms 1/16W
Q4	2SB710-QRS	Transistor	R60,61	YF2116103JT	Carbon 10K ohms 1/16W
Q5	2SA1037K7QRS	Transistor	R62	YF2116333GT	Carbon 33K ohms 1/16W
Q6-9	2SC2412K7QRS	Transistor	R63	YF2116563JT	Carbon 56K ohms 1/16W
Q10,11	2SA1037K7QRS	Transistor	R64,65	YF2116103JT	Carbon 10K ohms 1/16W
Q12	2SC2412K7QRS	Transistor	R66	YF2116510JT	Carbon 51 ohms 1/16W
Q13,14	2SA1037K7QRS	Transistor	R67	YF2116242GT	Carbon 2.4K ohms 1/16W
D1	MA157TW	Diode	R68	YF2116122JT	Carbon 1.2K ohms 1/16W
D2,3	MA151K	Diode	R69	YF2116622JT	Carbon 6.2K ohms 1/16W
D5	MA151K	Diode	R70	YF2116183GT	Carbon 18K ohms 1/16W
D6	DA106K	Diode	VR1	K111A5KBNC	Variable Resistor 5K ohms
R1	YF2116511JT	Carbon 510 ohms 1/16W	C1	ECEA1EU331	Electrolytic 330 µF 25V
R3	YF2116751JT	Carbon 750 ohms 1/16W	C2	ECEA1CKS100	Electrolytic 10 µF 16V
R4	YF2116221JT	Carbon 220 ohms 1/16W	C3	YF426473XKS	Ceramic 0.047 µF 50V
R6	YF2116223JT	Carbon 22K ohms 1/16W	C4	YF400101SLKT	Ceramic 100 pF
R7	YF2116332JT	Carbon 3.3K ohms 1/16W	C5	ECEA1HNR47	Electrolytic 0.47 µF 50V
R8	YF2116102GT	Carbon 1K ohms 1/16W	C6	ECEA1AKS470	Electrolytic 47 µF 10V
R9	YF2116101JT	Carbon 100 ohms 1/16W	C7	ECEA0JKS101	Electrolytic 100 µF 6.3V
R10	YF2116154JT	Carbon 150K ohms 1/16W	C8	ECEA1AKS470	Electrolytic 47 µF 10V
R11	YF2116623JT	Carbon 62K ohms 1/16W			
R12	YF2116152JT	Carbon 1.5K ohms 1/16W			
R13	YF2116222GT	Carbon 2.2K ohms 1/16W			

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
C9	YF400473XKT	Ceramic 0.047 μ F	PRE-PRE AMPLIFIER BOARD		
C10	ECEA0GKS221	Electrolytic 220 μ F 4V	PCB6	o YFVKZ00V3PCA	Printed Circuit Board Assy
C11	YF400102SLKT	Ceramic 1000 pF	Q1	2SK316Q	Transistor
C12	ECEA0JN330S	Electrolytic 33 μ F 6.3V	R1	ERD25TJ225	Carbon 2.2M ohms 1/4W
C13	ECEA1CKS100	Electrolytic 10 μ F 16V	R2	ERD25FJ105	Carbon 1M ohms 1/4W
C14	ECEA1HKS47	Electrolytic 0.47 μ F 50V	R3	ERJ8GCSJ331	Carbon 330 ohms 1/4W
C15	ECEA1AKS470	Electrolytic 47 μ F 10V	C1	YF426224FZ	Ceramic 0.22 μ F
C16	ECEA1ASS101	Electrolytic 100 μ F 10V	C2	YF426104DMS	Ceramic 0.1 μ F
C17	ECEA1AKS470	Electrolytic 47 μ F 10V	C3	ECSF1AE225	Tantalum 2.2 μ F 10V
C18	o ECEA1AKS100	Electrolytic 10 μ F 10V	PREAMPLIFIER BOARD		
C19	ECEA1AKS470	Electrolytic 47 μ F 10V	PCB7	o YFVKY00V3P2A	Printed Circuit Board Assy
C20	ECEA1HKN010	Electrolytic 1 μ F	Q1	2SA1022-BC	Transistor
C21	ECEA0JKS101	Electrolytic 100 μ F 6.3V	Q2	2SC2404-CD	Transistor
C22	ECEA1CKN100	Electrolytic 10 μ F 16V	Q3	2SA1022-BC	Transistor
C23	ECEA0JKS470	Electrolytic 47 μ F 6.3V	Q4	2SC2404-CD	Transistor
C24	ECEA0JKS101	Electrolytic 100 μ F 6.3V	R1	YF2116681JT	Carbon 680 ohms 1/16W
C25	ECEA0JKS470	Electrolytic 47 μ F 6.3V	R2	YF2116153JT	Carbon 15K ohms 1/16W
C26	YF400680SLKT	Ceramic 68 pF	R3	YF2116822JT	Carbon 8.2K ohms 1/16W
SW1	YWSSS322	Slide Switch	R4	YF2116153JT	Carbon 15K ohms 1/16W
SW2,3	YFSSJ312AN	Slide Switch	R5	YF2116332JT	Carbon 3.3K ohms 1/16W
SW4	YWSSS322	Slide Switch	R6	YF2116391JT	Carbon 390 ohms 1/16W
SW5	YFSSS323L4	Slide Switch	R7	YF2116472JT	Carbon 4.7K ohms 1/16W
F1,2	YFSP73A	Current Fuse 3A	R8	YF2116101JT	Carbon 100 ohms 1/16W
J5,29	YF21160R00T	Jumper Resistor	R9	YF2116392JT	Carbon 3.9K ohms 1/16W
CN1-JM	S2PS2T2EF	2 pin Jack Male	R10	YF2116822JT	Carbon 8.2K ohms 1/16W
CN2-JM	S3PS2T2EF	3 pin Jack Male	R11	YF2116104JT	Carbon 100K ohms 1/16W
CN4-JM	S5PS2T2EF	5 pin Jack Male	C1	ECSF1AE226	Electrolytic 22 μ F 10V
CN5-JM	S2PS2T2EF	2 pin Jack Male	C2	ECSF1CE226	Electrolytic 22 μ F 16V
CN6-JM	YFS8PS2T2EF	8 pin Jack Male	C3	YF400150CHJT	Ceramic 15 pF
LED BOARD			C4	YF400010CHDT	Ceramic 1 pF
PCB3	o YFVKC00V3P3A	Printed Circuit Board Assy	CT1	ECRGB025E11	Trimmer Capacitor
D7	LN11WP23F	LED	FILTER SENSOR BOARD		
M103	YFV2SA0201A4	Mounting Angle	PCB8	o YFVKY00V3P7A	Printed Circuit Board Assy
FRONT SWITCH (A) BOARD			Q1,2	2SA1034-ST	Transistor
PCB4	o YFVKZ00V3P4A	Printed Circuit Board Assy	VS1,2	NJL5141EB-AB	Semiconductor
D1	MA165	Diode	R1	YF2116102GT	Carbon 1K ohms 1/16W
SW1	YFA-15JB	Toggle Switch	R2	YF2116394JT	Carbon 390K ohms 1/16W
SW2	YFA-18HB	Toggle Switch	R3	YF2116154JT	Carbon 150K ohms 1/16W
FRONT SWITCH (B) BOARD			R4	YF2116103JT	Carbon 10K ohms 1/16W
PCB5	o YFVKZ00V3P5A	Printed Circuit Board Assy	R5	YF2116102GT	Carbon 1K ohms 1/16W
D1	MA165	Diode	R6	YF2116394JT	Carbon 390K ohms 1/16W
SW1	YFSPH222B	Push Switch	R7	YF2116154JT	Carbon 150K ohms 1/16W
SW2	YFSPH222A	Push Switch	R8	YF2116103JT	Carbon 10K ohms 1/16W

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
PROCESS BOARD			D10	MA151KTW	Diode
PCB9	o YFVKZ00V3P2A	Printed Circuit Board Assy	D11	MA151WK	Diode
IC1	NJM3414M	IC	D12	MA153	Diode
IC2	NJU4572UBM	IC	R1	YF2116332JT	Carbon 3.3K ohms 1/16W
IC3	NJM2904M	IC	R2	YF2116473GT	Carbon 47K ohms 1/16W
Q1,2	2SC2412K7QRS	Transistor	R3	YF2116102GT	Carbon 1K ohms 1/16W
Q3-5	2SA1037K7QRS	Transistor	R4	YF2116332JT	Carbon 3.3K ohms 1/16W
Q6-8	2SC2412K7QRS	Transistor	R5	YF2116272JT	Carbon 2.7K ohms 1/16W
Q9	2SA1034-ST	Transistor	R6	YF2116473GT	Carbon 47K ohms 1/16W
Q10,11	2SC2412K7QRS	Transistor	R7	YF2116122JT	Carbon 1.2K ohms 1/16W
Q12-14	2SA1037K7QRS	Transistor	R8,9	YF2116821GT	Carbon 820 ohms 1/16W
Q15-19	2SC2412K7QRS	Transistor	R10-12	YF2116102GT	Carbon 1K ohms 1/16W
Q20-23	2SA1037K7QRS	Transistor	R13	YF2116331JT	Carbon 330 ohms 1/16W
Q24-29	2SC2412K7QRS	Transistor	R14	YF2116222GT	Carbon 2.2K ohms 1/16W
Q30	2SC2405STU	Transistor	R15	YF2116102GT	Carbon 1K ohms 1/16W
Q31	2SC2412K7QRS	Transistor	R16	YF2116392JT	Carbon 3.9K ohms 1/16W
Q32	2SC2405STU	Transistor	R17	YF2116102GT	Carbon 1K ohms 1/16W
Q33	2SC2412K7QRS	Transistor	R18	YF2116153JT	Carbon 15K ohms 1/16W
Q34	2SA1037K7QRS	Transistor	R19	YF2116101JT	Carbon 100 ohms 1/16W
Q35	2SC2405STU	Transistor	R20	YF2116332JT	Carbon 3.3K ohms 1/16W
Q36	2SC2404-CD	Transistor	R21	YF2116102GT	Carbon 1K ohms 1/16W
Q37	2SC2412K7QRS	Transistor	R22	YF2116473GT	Carbon 47K ohms 1/16W
Q38	2SA1037K7QRS	Transistor	R23	YF2116332JT	Carbon 3.3K ohms 1/16W
Q39	2SC2412K7QRS	Transistor	R24	YF2116473GT	Carbon 47K ohms 1/16W
Q40,41	2SA1022-BC	Transistor	R25	YF2116272JT	Carbon 2.7K ohms 1/16W
Q42~44	2SC2404-CD	Transistor	R26	YF2116122JT	Carbon 1.2K ohms 1/16W
Q45	2SA1022-BC	Transistor	R27,28	YF2116821GT	Carbon 820 ohms 1/16W
Q46	2SC2412K7QRS	Transistor	R29	YF2116332JT	Carbon 3.3K ohms 1/16W
Q47-51	2SC2404-CD	Transistor	R30	YF2116102GT	Carbon 1K ohms 1/16W
Q52	2SC2412K7QRS	Transistor	R31	YF2116103JT	Carbon 10K ohms 1/16W
Q53	2SA1037K7QRS	Transistor	R32-34	YF2116681JT	Carbon 680 ohms 1/16W
Q54	2SD602-QRS	Transistor	R35	YF2116222GT	Carbon 2.2K ohms 1/16W
Q55	2SB710-QRS	Transistor	R36	YF2116223JT	Carbon 22K ohms 1/16W
Q56	2SD602-QRS	Transistor	R37	YF2116392JT	Carbon 3.9K ohms 1/16W
Q57,58	2SC2412K7QRS	Transistor	R38	YF2116102GT	Carbon 1K ohms 1/16W
Q59	2SC641K-C	Transistor	R39	YF2116332JT	Carbon 3.3K ohms 1/16W
Q60	2SC2405STU	Transistor	R40	YF2116473GT	Carbon 47K ohms 1/16W
Q61	2SA1034-ST	Transistor	R41	YF2116102GT	Carbon 1K ohms 1/16W
Q62,63	2SC2404-CD	Transistor	R42	YF2116332JT	Carbon 3.3K ohms 1/16W
Q64	2SA1037K7QRS	Transistor	R43	YF2116473GT	Carbon 47K ohms 1/16W
Q65,66	2SC2412K7QRS	Transistor	R44	YF2116272JT	Carbon 2.7K ohms 1/16W
Q67	2SC641K-C	Transistor	R45	YF2116122JT	Carbon 1.2K ohms 1/16W
Q68	2SC2405STU	Transistor	R46,47	YF2116821GT	Carbon 820 ohms 1/16W
Q69	2SA1034-ST	Transistor	R48	YF2116103JT	Carbon 10K ohms 1/16W
Q70,71	2SC2404-CD	Transistor	R49	YF2116681JT	Carbon 680 ohms 1/16W
Q72	2SA1037K7QRS	Transistor	R50	YF2116560GT	Carbon 56 ohms 1/16W
Q73-77	2SC2412K7QRS	Transistor	R51	YF2116180GT	Carbon 18 ohms 1/16W
Q78,79	2SC2404-CD	Transistor	R52	YF2116220GT	Carbon 22 ohms 1/16W
Q80-82	2SC2412K7QRS	Transistor	R53	YF2116122GT	Carbon 1.2K ohms 1/16W
Q83	2SA1037K7QRS	Transistor	R54	YF2116472GT	Carbon 4.7 ohms 1/16W
Q84-88	2SC2412K7QRS	Transistor	R55	YF2116681GT	Carbon 680 ohms 1/16W
Q89	2SK128	Transistor	R56	YF2116392GT	Carbon 3.9K ohms 1/16W
Q91,92	2SC2412K7QRS	Transistor	R57	YF2116681JT	Carbon 680 ohms 1/16W
D1	MA151A	Diode	R58	YF2116222GT	Carbon 2.2K ohms 1/16W
D2-7	MA151K	Diode	R59	YF2116681JT	Carbon 680 ohms 1/16W
D8,9	1S1925	Diode			

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R60	YF2116274JT	Carbon	270K ohms 1/16W	R139	YF2116132JT	Carbon	1.3K ohms 1/16W
R61	YF2116222GT	Carbon	2.2K ohms 1/16W	R140	YF2116122JT	Carbon	1.2K ohms 1/16W
R62	YF2116103JT	Carbon	10K ohms 1/16W	R141	YF2116223JT	Carbon	22K ohms 1/16W
R63	YF2116272GT	Carbon	2.7K ohms 1/16W	R142	YF2116122JT	Carbon	1.2K ohms 1/16W
R64	YF2116223JT	Carbon	22K ohms 1/16W				
R65	YF2116392JT	Carbon	3.9K ohms 1/16W	R143	YF2116223JT	Carbon	22K ohms 1/16W
R66	YF2116102GT	Carbon	1K ohms 1/16W	R144	YF2116122JT	Carbon	1.2K ohms 1/16W
R67	YF2116332GT	Carbon	3.3K ohms 1/16W	R145,146	YF2116182GT	Carbon	1.8K ohms 1/16W
R68	YF2116242GT	Carbon	2.4K ohms 1/16W	R147	YF2116392JT	Carbon	3.9K ohms 1/16W
R69	YF2116132GT	Carbon	1.3K ohms 1/16W	R148	YF2116101JT	Carbon	100 ohms 1/16W
R70	YF2116362GT	Carbon	3.6K ohms 1/16W	R149	YF2116472JT	Carbon	4.7K ohms 1/16W
R71	YF2116103GT	Carbon	10K ohms 1/16W	R150	YF2116222GT	Carbon	2.2K ohms 1/16W
R72-76	YF2116102GT	Carbon	1K ohms 1/16W	R151,152	YF21162R2JT	Carbon	2.2 ohms 1/16W
R77	YF2116683GT	Carbon	68K ohms 1/16W	R153	YF2116103JT	Carbon	10K ohms 1/16W
R78	YF2116103JT	Carbon	10K ohms 1/16W	R154	YF2116101JT	Carbon	100 ohms 1/16W
R79	YF2116153JT	Carbon	15K ohms 1/16W	R155	YF2116752JT	Carbon	7.5K ohms 1/16W
R83	YF2116681JT	Carbon	680 ohms 1/6W	R156	YF2116102GT	Carbon	1K ohms 1/16W
R84	YF2116561JT	Carbon	560 ohms 1/16W	R158	YF2116561JT	Carbon	560 ohms 1/16W
R85	YF2116821GT	Carbon	820 ohms 1/16W	R159	YF2116392JT	Carbon	3.9K ohms 1/16W
R86	YF2116123GT	Carbon	12K ohms 1/16W	R160	YF2116272JT	Carbon	2.7K ohms 1/16W
R87	YF2116152JT	Carbon	1.5K ohms 1/16W	R163,164	YF2116102GT	Carbon	1K ohms 1/16W
R88	YF2116102GT	Carbon	1K ohms 1/16W	R165	YF2116393GT	Carbon	39K ohms 1/16W
R89	YF2116272JT	Carbon	2.7K ohms 1/16W	R166	YF2116222GT	Carbon	2.2K ohms 1/16W
R93	YF2116561GT	Carbon	560 ohms 1/16W	R167	YF2116272JT	Carbon	2.7K ohms 1/16W
R94	YF2116821GT	Carbon	820 ohms 1/16W				
R95	YF2116561JT	Carbon	560 ohms 1/16W	R168	YF2116103JT	Carbon	10K ohms 1/16W
R96	YF2116183JT	Carbon	18K ohms 1/16W	R169	YF2116151JT	Carbon	150 ohms 1/16W
R97	YF2116152JT	Carbon	1.5K ohms 1/16W	R170	YF2116821JT	Carbon	820 ohms 1/16W
R98	YF2116102GT	Carbon	1K ohms 1/16W	R171	YF2116222GT	Carbon	2.2K ohms 1/16W
R99	YF2116272JT	Carbon	2.7K ohms 1/16W	R172	YF2116101JT	Carbon	100 ohms 1/16W
R100-102	YF2116102GT	Carbon	1K ohms 1/16W	R173	YF2116103JT	Carbon	10K ohms 1/16W
R106	YF2116682JT	Carbon	6.8K ohms 1/16W	R174,175	YF2116561JT	Carbon	560 ohms 1/16W
R107-109	YF2116102GT	Carbon	1K ohms 1/16W	R176	YF2116392JT	Carbon	3.9K ohms 1/16W
R110	YF2116223JT	Carbon	18K ohms 1/16W	R177,178	YF2116102GT	Carbon	1K ohms 1/16W
R111	YF2116101JT	Carbon	100 ohms 1/16W	R179	YF2116393GT	Carbon	39K ohms 1/16W
R112	YF2116153JT	Carbon	15K ohms 1/16W	R180	YF2116272JT	Carbon	2.7K ohms 1/16W
R113	YF2116682JT	Carbon	6.8K ohms 1/16W	R181	YF2116103JT	Carbon	10K ohms 1/16W
R114,115	YF2116821GT	Carbon	820 ohms 1/16W	R182	YF2116151JT	Carbon	150 ohms 1/16W
R116	YF2116392JT	Carbon	3.9K ohms 1/16W	R183	YF2116471JT	Carbon	470 ohms 1/16W
R117	YF2116682JT	Carbon	6.8K ohms 1/16W	R184	YFV2116821JT	Carbon	820 ohms 1/16W
R118	YF2116333GT	Carbon	33K ohms 1/16W	R185	YF2116222GT	Carbon	2.2K ohms 1/16W
R119	YF2116152JT	Carbon	1.5K ohms 1/16W	R186	YF2116122JT	Carbon	1.2K ohms 1/16W
R120-122	YF2116102GT	Carbon	1K ohms 1/16W	R187	YF2116101JT	Carbon	100 ohms 1/16W
R123,124	YF2116152JT	Carbon	1.5K ohms 1/16W	R188	YF2116103JT	Carbon	10K ohms 1/16W
R125	YF2116102GT	Carbon	1K ohms 1/16W	R189,190	YF2116561JT	Carbon	560 ohms 1/16W
R126	YF2116333GT	Carbon	33K ohms 1/16W	R191	YF2116392JT	Carbon	3.9K ohms 1/16W
R127	YF2116101JT	Carbon	100 ohms 1/16W	R192	YF2116102GT	Carbon	1K ohms 1/16W
R128	YF2116331JT	Carbon	330 ohms 1/16W	R193	YF2116822JT	Carbon	8.2K ohms 1/16W
R129	YF2116182GT	Carbon	1.8K ohms 1/16W	R194	YF2116103JT	Carbon	10K ohms 1/16W
R130	YF2116103JT	Carbon	10K ohms 1/16W	R195-197	YF2116152JT	Carbon	1.5K ohms 1/16W
R131	YF2116223JT	Carbon	22K ohms 1/16W	R198	YF2116182GT	Carbon	1.8K ohms 1/16W
R132	YF2116333GT	Carbon	33K ohms 1/16W	R199	YF2116222GT	Carbon	2.2K ohms 1/16W
R133	YF2116331JT	Carbon	330 ohms 1/16W	R200	YF2116474JT	Carbon	470K ohms 1/16W
R134	YF2116182JT	Carbon	1.8K ohms 1/16W	R201	YF2116391JT	Carbon	390 ohms 1/16W
R135	YF2116472JT	Carbon	4.7K ohms 1/16W	R202	YF2116102GT	Carbon	1K ohms 1/16W
R136	YF2116223JT	Carbon	22K ohms 1/16W				
R137	YF2116102GT	Carbon	1K ohms 1/16W	R203	YF2116223JT	Carbon	22K ohms 1/16W
R138	YF2116223JT	Carbon	22K ohms 1/16W	R204	YF2116152JT	Carbon	1.5K ohms 1/16W

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R205	YF2116102GT	Carbon	1K ohms 1/16W	VR19	EVN8ACA00B13	Variable Resistor	1K ohms
R206	YF2116272JT	Carbon	2.7K ohms 1/16W	VR20,21	EVN8ACA00BE3	Variable Resistor	2.2K ohms
R207	YF2116102GT	Carbon	1K ohms 1/16W	Z1	EXBD83313G	Block Resistor	
				Z2	EXBD83315G	Block Resistor	
				Z3	EXBD83314G	Block Resistor	
R208,209	YF2116681JT	Carbon	680 ohms 1/16W				
R210,211	YF2116102GT	Carbon	1K ohms 1/16W	C1,2	ECEA1AU470	Electrolytic	47 μ F 10V
R212	YF2116223JT	Carbon	22K ohms 1/16W	C3	ECEA0JKS470	Electrolytic	47 μ F 6.3V
R213	YF2116102GT	Carbon	1K ohms 1/16W	C4	ECEA1ASS101	Electrolytic	100 μ F 10V
R214	YF2116222GT	Carbon	2.2K ohms 1/16W				
R215,216	YF2116471JT	Carbon	470 ohms 1/16W	C5	YF426224FZS	Ceramic	0.22 μ F 50V
R217	YF2116152JT	Carbon	1.5K ohms 1/16W	C6	ECEA1AU470	Electrolytic	47 μ F 10V
R218	YF2116102GT	Carbon	1K ohms 1/16W	C7	ECEA0JKS470	Electrolytic	47 μ F 6.3V
R219	YF2116332JT	Carbon	3.3K ohms 1/16W	C8	ECEA1ASS101	Electrolytic	100 μ F 10V
R220	YF2116472JT	Carbon	4.7K ohms 1/16W	C9	ECEA1AU470	Electrolytic	47 μ F 10V
R221	YF2116102GT	Carbon	1K ohms 1/16W	C10	ECEA1CKS100	Electrolytic	10 μ F 16V
R222	YF2116392JT	Carbon	3.9K ohms 1/16W	C11	ECEA0JKS470	Electrolytic	47 μ F 6.3V
R223	YF2116332JT	Carbon	3.3K ohms 1/16W	C12	ECEA1AKS470	Electrolytic	47 μ F 10V
R224	YF2116472JT	Carbon	4.7K ohms 1/16W	C13	ECEA1AU471	Electrolytic	470 μ F 10V
R225,226	YF2116103JT	Carbon	10K ohms 1/16W	C14	YF400104FZT	Ceramic	0.1 μ F
R227	YF2116222GT	Carbon	2.2K ohms 1/16W	C15	YF400151CHJT	Ceramic	150 pF
R228	YF2116102GT	Carbon	1K ohms 1/16W	C16,17	ECEA1AU470	Electrolytic	47 μ F 10V
R229	YF2116101JT	Carbon	100 ohms 1/16W	C18	YF400201CHJT	Ceramic	200 pF
R230	YF2116102GT	Carbon	1K ohms 1/16W	C19	YF400221CHJT	Ceramic	220 pF
R231	YF2116332JT	Carbon	3.3K ohms 1/16W	C20	YF400180CHJT	Ceramic	18 pF
R232	YF2116100JT	Carbon	10 ohms 1/16W	C21	YF426224FZS	Ceramic	0.22 μ F 50V
R233	YF2116822JT	Carbon	8.2K ohms 1/16W	C22	ECEA1AU470	Electrolytic	47 μ F 10V
R234	YF2116272JT	Carbon	2.7K ohms 1/16W	C23	YF400201CHJT	Ceramic	200 pF
R235-237	YF2116102GT	Carbon	1K ohms 1/16W	C24	YF400221CHJT	Ceramic	220 pF
R238,239	YF2116821JT	Carbon	820 ohms 1/16W	C25	YF400180CHJT	Ceramic	18 pF
R240	YF2116470JT	Carbon	47 ohms 1/16W				
R241	YF2116113GT	Carbon	11K ohms 1/16W	C26	YF400222XKT	Ceramic	2200 pF
				C27	YF426224FZS	Ceramic	0.22 μ F 50V
R242	YF2116122JT	Carbon	1.2K ohms 1/16W	C28	ECEA1AU470	Electrolytic	47 μ F 10V
R243	YF2116152JT	Carbon	1.5K ohms 1/16W	C29,30	YF426224FZS	Ceramic	0.22 μ F 50V
R244	YF2116113JT	Carbon	11K ohms 1/16W	C31	ECEA1ASS102	Electrolytic	1000 μ F 10V
R245	YF2116122JT	Carbon	1.2K ohms 1/16W				
R246,247	YF2116681JT	Carbon	680 ohms 1/16W	C32	ECEA1AU470	Electrolytic	47 μ F 10V
				C33	ECEA1AKS470	Electrolytic	47 μ F 10V
R248	YF2116471JT	Carbon	470 ohms 1/16W	C34	ECEA1AU470	Electrolytic	47 μ F 10V
R249	YF2116223JT	Carbon	22K ohms 1/16W	C35	400040CHDT	Ceramic	4 pF
R250	YF2116104JT	Carbon	100K ohms 1/16W	C36,37	YF426224FZS	Ceramic	0.22 μ F 50V
R251	YF2116151JT	Carbon	150 ohms 1/16W				
R252	YF2116272JT	Carbon	2.7K ohms 1/16W	C38	YF400222XKT	Ceramic	2200 pF
				C39	YF400103XMT	Ceramic	0.01 μ F
R253	YF2116102GT	Carbon	1K ohms 1/16W	C40	YF400150CHJT	Ceramic	15 pF
R254	YF2116333GT	Carbon	33K ohms 1/16W	C41,42	YF400222XKT	Ceramic	2200 pF
R256	YF2116561JT	Carbon	560 ohms 1/16W	C43	YF400103XMT	Ceramic	0.01 μ F
R258	YF2116101JT	Carbon	100 ohms 1/16W				
R259	YF2116104JT	Carbon	100K ohms 1/16W	C44,45	YF400222XKT	Ceramic	2200 pF
R260	YF2116101JT	Carbon	100 ohms 1/16W	C46	ECEA1CN100S	Electrolytic	10 μ F 16V
R261,262	YF2116392JT	Carbon	3.9K ohms 1/16W	C47-49	ECEA0JU220	Electrolytic	22 μ F 6.3V
VR1-3	EVN8ACA00B13	Variable Resistor	1K ohms	C50	ECEA1AU470	Electrolytic	47 μ F 10V
				C51	ECEA0JU102	Electrolytic	1000 pF 6.3V
VR4-6	EVN8ACA00BC3	Variable Resistor	1.5K ohms				
VR7	EVN8ACA00B14	Variable Resistor	10K ohms	C53-55	ECEA1AU470	Electrolytic	47 μ F 10V
VR8,9	EVN8ACA00BE4	Variable Resistor	22K ohms	C56	YF426224FZS	Ceramic	0.22 μ F 50V
VR10,11	YWH0651A680	Variable Resistor	680 ohms	C57	ECEA0JKS470	Electrolytic	47 μ F 6.3V
VR12,13	EVN8ACA00BQ3	Variable Resistor	4.7K ohms	C58	ECEA0JU101	Electrolytic	100 μ F 6.3V
				C59,60	YF400222XKT	Ceramic	2200 pF
VR14,15	EVN8ACA00BE3	Variable Resistor	2.2K ohms	C61	ECEA0JKS470	Electrolytic	47 μ F 6.3V
VR16	YFH0521A47K	Variable Resistor	47K ohms	C62	YF426224FZS	Ceramic	0.22 μ F 50V
VR17	EVN8ACA00BY3	Variable Resistor	3.3K ohms	C63	ECEA0JU101	Electrolytic	100 μ F 6.3V
VR18	EVN8ACA00BQ3	Variable Resistor	4.7K ohms				

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
C64	ECEA1AKS470	Electrolytic	47 μ F 10V	Q21,22	2SA1037K7QRS	Transistor	
C65	ECEA0JKS101	Electrolytic	100 μ F 6.3V	Q23,24	2SC2412K7QRS	Transistor	
C66,67	ECEA1HKS010	Electrolytic	1 μ F 50V	Q25,26	2SA1037K7QRS	Transistor	
C68	ECEA1AKS470	Electrolytic	47 μ F 10V	R1	YF2116472JT	Carbon	4.7K ohms 1/16W
C69	ECEA0JKS101	Electrolytic	100 μ F 6.3V	R2	YF2116821GT	Carbon	820 ohms 1/16W
C70-73	ECEA1AKS470	Electrolytic	47 μ F 10V	R3	YF2116331JT	Carbon	330 ohms 1/16W
C75	YF400300CHJT	Ceramic	30 pF	R4	YF2116182GT	Carbon	1.8K ohms 1/16W
C76,77	YF400222XKT	Ceramic	2200 pF	R5	YF2116821GT	Carbon	820 ohms 1/16W
C78	YF400300CHJT	Ceramic	30 pF	R6	YF2116101JT	Carbon	100 ohms 1/16W
C79,80	YF400070HJT	Ceramic	7 pF	R7	YF2116472JT	Carbon	4.7K ohms 1/16W
C81	YF400104FZT	Ceramic	0.1 μ F	R8	YF2116223JT	Carbon	22K ohms 1/16W
C82-84	ECEA1AU221	Electrolytic	220 μ F 10V	R9	YF2116822JT	Carbon	8.2K ohms 1/16W
C85,86	ECEA1AU470	Electrolytic	47 μ F 10V	R10	YF2116332JT	Carbon	3.3K ohms 1/16W
C87	ECEA1AU471	Electrolytic	470 μ F 10V	R11	YF2116223JT	Carbon	22K ohms 1/16W
C88	YF400104FZT	Ceramic	0.1 μ F	R12	YF2116561JT	Carbon	560 ohms 1/16W
C89	ECEA1AU222	Electrolytic	2200 μ F 10V	R13	YF2116222GT	Carbon	2.2K ohms 1/16W
C90	YF400120CHJT	Ceramic	12 pF	R14	YF2116182GT	Carbon	1.8K ohms 1/16W
C91	ECSF1CE106	Tantalum	10 μ F 16V	R15	YF2116331JT	Carbon	330 ohms 1/16W
C92	ECEA1HKK3R3	Electrolytic	3.3 μ F 50V	R16,17	YF2116561JT	Carbon	560 ohms 1/16W
C93	YF400151CHJT	Ceramic	150 pF	R18,19	YF2116331JT	Carbon	330 ohms 1/16W
C94	YF400050CHJT	Ceramic	5 pF	R20	YF2116562JT	Carbon	5.6K ohms 1/16W
C95	ECEA1AU221	Electrolytic	220 μ F	R21	YF2116682JT	Carbon	6.8K ohms 1/16W
C96	YF400103XKT	Ceramic	0.01 μ F	R22	YF2116222GT	Carbon	2.2K ohms 1/16W
C98	ECSF0JKS226	Tantalum	22 μ F 6.3V	R23	YF2116153JT	Carbon	15K ohms 1/16W
CT1	YFTZ03R300FR	Trimmer Capacitor	30 pF	R24	YF2116271JT	Carbon	270 ohms 1/16W
L1	EL05S1470K	Coil	4.7 μ H	R25	YF2116332JT	Carbon	3.3K ohms 1/16W
SW1	YFSSS313	Slide Switch		R26	YF2116682JT	Carbon	6.8K ohms 1/16W
SW2	YFSSS323L4	Slide Switch		R27	YF2116752JT	Carbon	7.5K ohms 1/16W
SW3	YWSSS21200	Slide Switch		R28	YF2116102GT	Carbon	1K ohms 1/16W
CF1	YFSLC871-197	Filter		R29	YF2116223JT	Carbon	22K ohms 1/16W
CF2,3	YFELB4M025	Filter		R30	YF2116102GT	Carbon	1K ohms 1/16W
CF4	YFELB5G061	Filter		R31	YF2116123JT	Carbon	12K ohms 1/16W
CF5	YFELB5G057	Filter		R32	YF2116332JT	Carbon	3.3K ohms 1/16W
CF6	YFELB5G058	Filter		R33	YF2116153JT	Carbon	15K ohms 1/16W
J90	YF21160R00T	Jumper Resistor		R34	YF2116223JT	Carbon	22K ohms 1/16W
CN1	YFZC028	28 pin Multi Connector		R35	YF2116682JT	Carbon	6.8K ohms 1/16W
CN2	YFZC014	14 pin Multi Connector		R36	YF2116332JT	Carbon	3.3K ohms 1/16W
CN3-JF	YFFPC10SS1T1	10 pin Jack Female		R37	YF2116471JT	Carbon	470 ohms 1/16W
CN4-JM	S5PS2T2EF	5 pin Jack Male		R38	YF2116222GT	Carbon	2.2K ohms 1/16W
CN5-JM	S2PS2T2EF	2 pin Jack Male		R39	YF2116681JT	Carbon	680 ohms 1/16W
CN6-JM	S5PS2T2EF	5 pin Jack Male		R40	YF2116183GT	Carbon	18K ohms 1/16W
CN7-JM	S4PS2T2EF	4 pin Jack Male		R41	YF2116681JT	Carbon	680 ohms 1/16W
CN8-10-JM	S5PS2T2EF	5 pin Jack Male		R42	YF2116222GT	Carbon	2.2K ohms 1/16W
M111	oYFV2HA0282A3	Shield Cover A		R43	YF2116102GT	Carbon	1K ohms 1/16W
M112	oYFV2HA0283A3	Shield Cover B		R44,45	YF2116332JT	Carbon	3.3K ohms 1/16W
M113	oYFV2HA0284A3	Shield Cover C		R46	YF2116392JT	Carbon	3.9K ohms 1/16W
PROCESS VIC 1 BOARD				R47	YF2116152JT	Carbon	1.5K ohms 1/16W
PCB9-1	oYFVKB00V3P1A	Printed Circuit Board Assy		R48	YF2116222GT	Carbon	2.2K ohms 1/16W
IC1	YFNJM1496M	IC		R49	YF2116152JT	Carbon	1.5K ohms 1/16W
Q1-3	2SC2404-CD	Transistor		R50	YF2116332JT	Carbon	3.3K ohms 1/16W
Q4	2SC2405STU	Transistor		VR1	YFH0522A470	Variable Resistor	47 ohms
Q5	2SC2404-CD	Transistor		VR2	H0522A330	Variable Resistor	330 ohms
Q6	2SC2405STU	Transistor		VR3	YFH0522A1K	Variable Resistor	1K ohms
Q7,8	2SC2404-CD	Transistor		C1	ECEA1ASS101	Electrolytic	100 μ F 10V
Q9	2SC2405STU	Transistor		C2	ECEA1AKS470	Electrolytic	47 μ F 10V
Q10-13	2SC2404-CD	Transistor		C3	YF400473FZT	Ceramic	0.047 μ F
Q14	2SA1034-ST	Transistor					
Q15	2SC2404-CD	Transistor					
Q16-20	2SC2412K7QRS	Transistor					

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
C4	YF426224FZS	Ceramic	0.22 μ F 50V	R29	YF2116223JT	Carbon	22K ohms 1/16W
C5	ECEA0GKS470	Electrolytic	47 μ F 4V	R30	YF2116102GT	Carbon	1K ohms 1/16W
C6	YF400220CHJT	Ceramic	22 pF	R31	YF2116272JT	Carbon	2.7K ohms 1/16W
C7	YF400104FZT	Ceramic	0.1 μ F	R32	YF2116332JT	Carbon	3.3K ohms 1/16W
C8	ECEA1CSN100	Electrolytic	10 μ F 16V	R33	YF2116153JT	Carbon	15K ohms 1/16W
C9,10	YF426224FZS	Ceramic	0.22 μ F 50V	R34	YF2116223JT	Carbon	22K ohms 1/16W
C11	ECEA1CKS100	Electrolytic	10 μ F 16V	R35	YF2116682JT	Carbon	6.8K ohms 1/16W
C12	YF400150CHJT	Ceramic	15 pF	R36	YF2116332JT	Carbon	3.3K ohms 1/16W
C13	ECEA1AKS470	Electrolytic	47 μ F 10V	R37	YF2116471JT	Carbon	470 ohms 1/16W
C14	ECCF1H150JC	Ceramic	15PF 50V	R38	YF2116222GT	Carbon	2.2K ohms 1/16W
BI1(E1)	YFIH10209	9 pin BI Connector		R39	YF2116681JT	Carbon	680 ohms 1/16W
BI2(E2)	YFIH10205	5 pin BI Connector		R40	YF2116183GT	Carbon	18K ohms 1/16W
BI3(E3)	YFIH10206	6 pin BI Connector		R41	YF2116681JT	Carbon	680 ohms 1/16W
PROCESS VIC 2 BOARD				R42	YF2116222GT	Carbon	2.2K ohms 1/16W
PCB9-2	o YFVKC00V3P1A	Printed Circuit Board Assy		R43	YF2116102GT	Carbon	1K ohms 1/16W
IC1	YFNJM1496M	IC		R44,45	YF2116332JT	Carbon	3.3K ohms 1/16W
Q1-3	2SC2404-CD	Transistor		R46	YF2116392JT	Carbon	3.9K ohms 1/16W
Q4	2SC2405STU	Transistor		R47	YF2116152JT	Carbon	1.5K ohms 1/16W
Q5	2SC2404-CD	Transistor		R48	YF2116222GT	Carbon	2.2K ohms 1/16W
Q6	2SC2405STU	Transistor		R49	YF2116152JT	Carbon	1.5K ohms 1/16W
Q7,8	2SC2404-CD	Transistor		VR1,2	H0522A330	Variable Resistor	330 ohms
Q9	2SC2405STU	Transistor		VR3	YFH0522A1K	Variable Resistor	1K ohms
Q10-13	2SC2404-CD	Transistor		C1	ECEA1ASS101	Electrolytic	100 μ F 10V
Q14	2SA1034-ST	Transistor		C2	ECEA1AKS470	Electrolytic	47 μ F 10V
Q15	2SC2404-CD	Transistor		C3	YF400473FZT	Ceramic	0.047 μ F
Q16-20	2SC2412K7QRS	Transistor		C4	YF426224FZS	Ceramic	0.22 μ F 50V
Q21,22	2SA1037K7QRS	Transistor		C5	ECEA0GKS470	Electrolytic	47 μ F 4V
Q23,24	2SC2412K7QRS	Transistor		C6	YF400220CHJT	Ceramic	22 pF
Q25,26	2SA1037K7QRS	Transistor		C7	YF400104FZT	Ceramic	0.1 μ F
R1	YF2116472JT	Carbon	4.7K ohms 1/16W	C8	ECEA1CSN100	Electrolytic	10 μ F 16V
R2	YF2116821GT	Carbon	820 ohms 1/16W	C9,10	YF426224FZS	Ceramic	0.22 μ F 50V
R3	YF2116331JT	Carbon	330 ohms 1/16W	C11	ECEA1CKS100	Electrolytic	10 μ F 16V
R4	YF2116182GT	Carbon	1.8K ohms 1/16W	C12	YF400150CHJT	Ceramic	15 pF
R5	YF2116821GT	Carbon	820 ohms 1/16W	C13	ECEA1AKS470	Electrolytic	47 μ F 10V
R6	YF2116101JT	Carbon	100 ohms 1/16W	J20	YF21160R00T	Jumper Resistor	
R7	YF2116472JT	Carbon	4.7K ohms 1/16W	CN1(E1)	YFIH1020-9	9 pin BI Connector	
R8	YF2116223JT	Carbon	22K ohms 1/16W	CN2(E2)	YFIH10205	5 pin BI Connector	
R9	YF2116822JT	Carbon	8.2K ohms 1/16W	CN3(E3)	YFIH10206	6 pin BI Connector	
R10	YF2116332JT	Carbon	3.3K ohms 1/16W	PROCESS VIC 3 BOARD			
R11	YF2116223JT	Carbon	22K ohms 1/16W	PCB9-3	o YFVKD00V3P1A	Printed Circuit Board Assy	
R12	YF2116561JT	Carbon	560 ohms 1/16W	IC1	YFNJM1496M	IC	
R13	YF2116222GT	Carbon	2.2K ohms 1/16W	Q1-3	2SC2404-CD	Transistor	
R14	YF2116182GT	Carbon	1.8K ohms 1/16W	Q4	2SC2405STU	Transistor	
R15	YF2116331JT	Carbon	330 ohms 1/16W	Q5	2SC2404-CD	Transistor	
R16,17	YF2116561JT	Carbon	560 ohms 1/16W	Q6	2SC2405STU	Transistor	
R18,19	YF2116331JT	Carbon	330 ohms 1/16W	Q7,8	2SC2404-CD	Transistor	
R21	YF2116682JT	Carbon	6.8K ohms 1/16W	Q9	2SC2405STU	Transistor	
R22	YF2116222GT	Carbon	2.2K ohms 1/16W	Q10-13	2SC2404-CD	Transistor	
R23	YF2116153JT	Carbon	15K ohms 1/16W	Q14	2SA1034-ST	Transistor	
R24	YF2116271JT	Carbon	270 ohms 1/16W	Q15	2SC2404-CD	Transistor	
R25	YF2116332JT	Carbon	3.3K ohms 1/16W	Q16-20	2SC2412K7QRS	Transistor	
R26	YF2116682JT	Carbon	6.8K ohms 1/16W	Q21,22	2SA1037K7QRS	Transistor	
R27	YF2116752JT	Carbon	7.5K ohms 1/16W				
R28	YF2116102GT	Carbon	1K ohms 1/16W				

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
Q23,24 Q25,26 R1	2SC2412K7QRS 2SA1037K7QRS YF2116472JT	Transistor Transistor Carbon 4.7K ohms 1/16W	C7	YF400104FZT	Ceramic 0.1 μ F
R2	YF2116471JT	Carbon 470 ohms 1/16W	C8	ECEA1CSN100	Electrolytic 10 μ F 16V
R3	YF2116680JT	Carbon 68 ohms 1/16W	C9,10	YF426224FZS	Ceramic 0.22 μ F 50V
R4	YF2116332JT	Carbon 3.3K ohms 1/16W	C11	ECEA1CKS100	Electrolytic 10 μ F 16V
R5	YF2116821GT	Carbon 820 ohms 1/16W	C12	YF400150CHJT	Ceramic 15 pF
R6	YF2116101JT	Carbon 100 ohms 1/16W	C13	ECEA1AKS470	Electrolytic 47 μ F 10V
R7	YF2116472JT	Carbon 4.7K ohms 1/16W	J20	YF21160R00T	Jumper Resistor
R8	YF2116223JT	Carbon 22K ohms 1/16W	BI1(E1)	YFIH10209	9 pin BI Connector
R9	YF2116822JT	Carbon 8.2K ohms 1/16W	BI2(E2)	YFIH10205	5 pin BI Connector
R10	YF2116332JT	Carbon 3.3K ohms 1/16W	BI3(E3)	YFIH10206	6 pin BI Connector
R11	YF2116223JT	Carbon 22K ohms 1/16W	PROCESS VIC 4 BOARD		
R12	YF2116561JT	Carbon 560 ohms 1/16W	PCB9-4	o YFVKB00V3P2A	Printed Circuit Board Assy
R13	YF2116222GT	Carbon 2.2K ohms 1/16W	IC1	NJU4053BM	IC
R14	YF2116182GT	Carbon 1.8K ohms 1/16W	Q1-3	2SA1037K7QRS	Transistor
R15	YF2116331JT	Carbon 330 ohms 1/16W	Q4	2SC2412K7QRS	Transistor
R16,17	YF2116561JT	Carbon 560 ohms 1/16W	Q5	2SA1037K7QRS	Transistor
R18,19	YF2116331JT	Carbon 330 ohms 1/16W	Q6-8	2SC2412K7QRS	Transistor
R21	YF2116682JT	Carbon 6.8K ohms 1/16W	R1	YF2116472JT	Carbon 12K ohms 1/16W
R22	YF2116222GT	Carbon 2.2K ohms 1/16W	R2	YF2116122JT	Carbon 1.2K ohms 1/16W
R23	YF2116153JT	Carbon 15K ohms 1/16W	R3	YF2116123JT	Carbon 12K ohms 1/16W
R24	YF2116271JT	Carbon 270 ohms 1/16W	R4	YF2116122JT	Carbon 1.2K ohms 1/16W
R25	YF2116332JT	Carbon 3.3K ohms 1/16W	R5	YF2116152JT	Carbon 1.5K ohms 1/16W
R26	YF2116682JT	Carbon 6.8K ohms 1/16W	R6	YF2116222GT	Carbon 2.2K ohms 1/16W
R27	YF2116752JT	Carbon 7.5K ohms 1/16W	R7	YF2116332JT	Carbon 3.3K ohms 1/16W
R28	YF2116102GT	Carbon 1K ohms 1/16W	R8	YF2116103JT	Carbon 10K ohms 1/16W
R29	YF2116223JT	Carbon 22K ohms 1/16W	R9	YF2116472JT	Carbon 4.7K ohms 1/16W
R30	YF2116102GT	Carbon 1K ohms 1/16W	R10	YF2116122JT	Carbon 1.2K ohms 1/16W
R31	YF2116272JT	Carbon 2.7K ohms 1/16W	R11	YF2116472JT	Carbon 4.7K ohms 1/16W
R32	YF2116332JT	Carbon 3.3K ohms 1/16W	R12	YF2116122JT	Carbon 1.2K ohms 1/16W
R33	YF2116153JT	Carbon 15K ohms 1/16W	R13	YF2116152JT	Carbon 1.5K ohms 1/16W
R34	YF2116223JT	Carbon 22K ohms 1/16W	R14	YF2116222GT	Carbon 2.2K ohms 1/16W
R35	YF2116682JT	Carbon 6.8K ohms 1/16W	R15	YF2116332JT	Carbon 3.3K ohms 1/16W
R36	YF2116332JT	Carbon 3.3K ohms 1/16W	R16	YF2116103JT	Carbon 10K ohms 1/16W
R37	YF2116471JT	Carbon 470 ohms 1/16W	R17	YF2116472JT	Carbon 4.7K ohms 1/16W
R38	YF2116222GT	Carbon 2.2K ohms 1/16W	R18	YF2116122JT	Carbon 1.2K ohms 1/16W
R39	YF2116681JT	Carbon 680 ohms 1/16W	R19	YF2116472JT	Carbon 4.7K ohms 1/16W
R40	YF2116183GT	Carbon 18K ohms 1/16W	R20	YF2116122JT	Carbon 1.2K ohms 1/16W
R41	YF2116681JT	Carbon 680 ohms 1/16W	R21	YF2116152JT	Carbon 1.5K ohms 1/16W
R42	YF2116222GT	Carbon 2.2K ohms 1/16W	R22	YF2116222GT	Carbon 2.2K ohms 1/16W
R43	YF2116102GT	Carbon 1K ohms 1/16W	R23	YF2116332JT	Carbon 3.3K ohms 1/16W
R44,45	YF2116332JT	Carbon 3.3K ohms 1/16W	R24	YF2116103JT	Carbon 10K ohms 1/16W
R46	YF2116392JT	Carbon 3.9K ohms 1/16W	R25	YF2116163GT	Carbon 16K ohms 1/16W
R47	YF2116152JT	Carbon 1.5K ohms 1/16W	R26	YF2116563GT	Carbon 56K ohms 1/16W
R48	YF2116222GT	Carbon 2.2K ohms 1/16W	R27	YF2116124JT	Carbon 120K ohms 1/16W
R49	YF2116152JT	Carbon 1.5K ohms 1/16W	R28	YF2116393JT	Carbon 39K ohms 1/16W
VR1,2	H0522A330	Variable Resistor 330 ohms	R29	YF2116393GT	Carbon 39K ohms 1/16W
VR3	YFH0522A1K	Variable Resistor 1K ohms	R30-35	YF2116562JT	Carbon 5.6K ohms 1/16W
C1	ECEA1ASS101	Electrolytic 100 μ F 10V	VR1-12	YFH0521A4R7K	Variable Resistor 4.7K ohms
C2	ECEA1AKS470	Electrolytic 47 μ F 10V	VR13-15	YFH0521A100K	Variable Resistor 100K ohms
C3	YF400473FZT	Ceramic 0.047 μ F	C1-3	ECEA1AKS470	Electrolytic 47 μ F 10V
C4	YF426224FZS	Ceramic 0.22 μ F 50V	C4-6	YF426224FZS	Ceramic 0.22 μ F 50V
C5	ECEA0GKS470	Electrolytic 47 μ F 4V	CN1(E1)	YFIH10207	7 pin BI Connector
C6	YF400220CHJT	Ceramic 22 pF	CN2(E2)	YFIH10205	5 pin BI Connector

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
PROCESS VIC 5 BOARD			Q2,3	2SC2405STU	Transistor
PCB9-5	o YFVKC00V3E2A	Printed Circuit Board Assy	Q4	2SC2412K7QRS	Transistor
IC1	NJU4516BM	IC	Q5	2SA1037K7QRS	Transistor
IC2	SC49069	IC	R1	YF2116223JT	Carbon 22K ohms 1/16W
Q1-3	2SC2412K7QRS	Transistor	R2-4	YF2116102GT	Carbon 1K ohms 1/16W
D1~4	MA151K	Diode	R5	YF2116561JT	Carbon 560 ohms 1/16W
R1	YF2116223JT	Carbon 22K ohms 1/16W	R6	YF2116153JT	Carbon 15K ohms 1/16W
R2-4	YF2116273GT	Carbon 27K ohms 1/16W	R7	YF2116362JT	Carbon 3.6K ohms 1/16W
R5-7	YF2116332GT	Carbon 3.3K ohms 1/16W	R8	YF2116391JT	Carbon 390 ohms 1/16W
R9,10	YF2116182GT	Carbon 1.8K ohms 1/16W	R9	YF2116102JT	Carbon 1K ohms 1/16W
R11	YF2116223JT	Carbon 22K ohms 1/16W	R10	YF2116681JT	Carbon 680 ohms 1/16W
R12-14	YF2116823JT	Carbon 82K ohms 1/16W	R11	YF2116332JT	Carbon 3.3K ohms 1/16W
C1	YF400181CHJT	Ceramic 180 pF	R12	YF2116103JT	Carbon 10K ohms 1/16W
C2	ECEA1AKS470	Electrolytic 47 μ F 10V	R13	YF2116222GT	Carbon 2.2K ohms 1/16W
PROCESS VIC 6 BOARD			R14	YF2116153JT	Carbon 15K ohms 1/16W
PCB9-6	o YFVKD00V3E2A	Printed Circuit Board Assy	R15	YF2116362JT	Carbon 3.6K ohms 1/16W
IC1	AN2020S	IC	VR1	YFH0522A3R3K	Variable Resistor 3.3K ohms
Q1	2SC2412K7QRS	Transistor	VR2-4	YFH0522A1K	Variable Resistor 1K ohms
Q2,3	2SC2404-CD	Transistor	C1	YF400270CHJT	Ceramic 27 pF
Q4	2SC2412K7QRS	Transistor	C2	ECEA1AKS470	Electrolytic 47 μ F 10V
Q5	2SC2405STU	Transistor	C3	YF400222XKT	Ceramic 2200 pF
R1	YF2116471JT	Carbon 470 ohms 1/16W	C4	YF400270CHJT	Ceramic 27 pF
R2	YF2116101JT	Carbon 100 ohms 1/16W	L1	YFNL45T470K	Coil 47 μ H
R3	YF2116562JT	Carbon 5.6K ohms 1/16W	CN1(E1)	YFIH10206	6 pin BI Connector
R4	YF2116223JT	Carbon 22K ohms 1/16W	CN2(E2)	YFIH10207	7 pin BI Connector
R5	YF2116622JT	Carbon 6.2K ohms 1/16W	PROCESS VIC 8 BOARD		
R6	YF2116273JT	Carbon 27K ohms 1/16W	PCB9-8	o YFVKF00V3P2A	Printed Circuit Board Assy
R7,8	YF2116222GT	Carbon 2.2K ohms 1/16W	IC1	SC49069	IC
R9	YF2116223JT	Carbon 22K ohms 1/16W	Q1,2	2SC2405STU	Transistor
R10	YF2116222GT	Carbon 2.2K ohms 1/16W	Q3	2SA1034-ST	Transistor
R11	YF2116222JT	Carbon 2.2K ohms 1/16W	Q4,5	2SC2404-CD	Transistor
R12	YF2116561JT	Carbon 560 ohms 1/16W	Q6	2SC2405STU	Transistor
R13	YF2116152JT	Carbon 1.5K ohms 1/16W	R1	YF2116222GT	Carbon 2.2K ohms 1/16W
R14	YF2116101JT	Carbon 100 ohms 1/16W	R2	YF2116392JT	Carbon 3.9K ohms 1/16W
R15	YF2116222GT	Carbon 2.2K ohms 1/16W	R3	YF2116103JT	Carbon 10K ohms 1/16W
VR1	YFH0522A470	Variable Resistor 47 ohms 1/16W	R4	YF2116392JT	Carbon 3.9K ohms 1/16W
VR2,3	YFH0522A3R3K	Variable Resistor 3.3K ohms	R5,6	YF2116223JT	Carbon 22K ohms 1/16W
VR4	YFH0522A1K	Variable Resistor 1K ohms	R7	YF2116362JT	Carbon 3.6K ohms 1/16W
C2	YF400070CHJT	Ceramic 7 pF	R8	YF2116621GT	Carbon 620 ohms 1/16W
C3	YF400222XKT	Ceramic 2200 pF	R9	YF2116182GT	Carbon 1.8K ohms 1/16W
C4	ECEA0JKS470	Electrolytic 47 μ F 6.3V	R10	YF2116102GT	Carbon 1K ohms 1/16W
C5	YF400104XKT	Ceramic 0.1 μ F	R11	YF2116104JT	Carbon 100K ohms 1/16W
C8	YF400104XKT	Ceramic 0.1 μ F	R12	YF2116122JT	Carbon 1.2K ohms 1/16W
C9	YF400222XKT	Ceramic 2200 pF	R13	ERD10TJ393	Carbon 39K ohms 1/8W
C11	ECEA0JKS220	Electrolytic 22 μ F 6.3V	VR1	YFH0522A3R3K	Variable Resistor 3.3K ohms
CN1(E1)	YFIH1020-10	10 pin BI Connector	C1	ECEA1CKS100	Electrolytic 10 μ F 16V
PROCESS VIC 7 BOARD			C2,3	ECEA0JKK100	Electrolytic 10 μ F 6.3V
PCB9-7	o YFVKE00V3E2A	Printed Circuit Board Assy	C4	ECEA0GKS330	Electrolytic 33 μ F 4V
IC1	SC49069	IC	CN1(E1)	YFIH10206	6 pin BI Connector
Q1	2SC2404-CD	Transistor	CN2(E2)	YFIH10205	5 pin BI Connector

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
PROCESS VIC 9 BOARD			R23	YF2116182GT	Carbon 1.8K ohms 1/16W
PCB9-9	oYFVKG00V3P2A	Printed Circuit Board Assy	R24	YF2116622GT	Carbon 6.2K
IC1	SC49069	IC	R25	YF2116123GT	Carbon 12K ohms
IC2	NJM2903M	IC	J11	YF21160R00T	Jumper Resistor
Q1-7	2SC2412K7QRS	Transistor	C1	YF400222XKT	Ceramic 2200 pF
R1	YF2116682JT	Carbon 6.8K ohms 1/16W	C2	ECEA1CKS100	Electrolytic 10 μ F 16V
R2-4	YF2116392JT	Carbon 3.9K ohms 1/16W	CN1(E1)	YFIH10205	5 pin BI Connector
			CN2(E2)	YFIH10207	7 pin BI Connector
R5,6	YF2116102GT	Carbon 1K ohms 1/16W	PROCESS VIC 11 BOARD		
R7	YF2116272JT	Carbon 2.7K ohms 1/16W	PCB9-11	oYFVKI00V3P2A	Printed Circuit Board Assy
			IC1	SC49069	IC
R10	YF2116222GT	Carbon 2.2K ohms 1/16W	Q1	2SC2404-CD	Transistor
R11	YF2116101JT	Carbon 100 ohms 1/16W	Q2,3	2SC2412K7QRS	Transistor
			R1	YF2116104JT	Carbon 100K ohms 1/16W
R12	YF2116123JT	Carbon 12K ohms 1/16W	R2	YF2116682JT	Carbon 6.8K ohms 1/16W
R13	YF2116682JT	Carbon 6.8K ohms 1/16W	R3	YF2116181JT	Carbon 180 ohms 1/16W
R14	YF2116102GT	Carbon 1K ohms 1/16W	R4	YF2116102GT	Carbon 1K ohms 1/16W
R15	YF2116563JT	Carbon 56K ohms 1/16W	R5	YF2116682JT	Carbon 6.8K ohms 1/16W
R16	YF2116392JT	Carbon 3.9K ohms 1/16W	R6	YF2116223JT	Carbon 22K ohms 1/16W
R17	YF2116182GT	Carbon 1.8K ohms 1/16W			
R18	YF2116822JT	Carbon 8.2K ohms 1/16W	R7	YF2116222GT	Carbon 2.2K ohms 1/16W
R19	YF2116682JT	Carbon 6.8K ohms 1/16W	R8	YF2116561JT	Carbon 560 ohms 1/16W
VR1	YFH0522A2R2K	Variable Resistor 2.2K ohms	R9	YF2116472JT	Carbon 4.7K ohms 1/16W
VR2	YFH0522A1K	Variable Resistor 1K ohms	R10	YF2116222GT	Carbon 2.2K ohms 1/16W
			R11	YF2116104JT	Carbon 100K ohms 1/16W
C1	YF400222XKT	Ceramic 2200 pF			
C2	ECEA1HKR47	Electrolytic 0.47 μ F 50V	R12	YF2116222GT	Carbon 2.2K ohms 1/16W
C3	ECEA0JKS220	Electrolytic 22 μ F 6.3V	R13	YF2116103JT	Carbon 10K ohms 1/16W
CN1(E1)	YFIH10208	8 pin BI Connector	C1	ECEA0JKS220	Electrolytic 22 μ F 6.3V
CN2(E2)	YFIH10206	6 pin BI Connector	C2	ECEA1CKS100	Electrolytic 10 μ F 16V
			C3	YF400224XKT	Ceramic 0.22 μ F
PROCESS VIC 10 BOARD			CN1(E1)	YFIH10208	8 pin Connector
PCB9-10	oYFVKH00V3E2A	Printed Circuit Board Assy	CN2(E2)	YFIH10205	5 pin Connector
IC1	NJU4053BM	IC	PROCESS VIC 12 BOARD		
IC2	YFNJM1496M	IC	PCB9-12	oYFVKJ00V3P2A	Printed Circuit Board Assy
IC3	NJM3415M	IC	IC1	NJM2903M	IC
Q1-3	2SC2412K7QRS	Transistor	IC2	SC49069	IC
			Q1	2SA1037K7QRS	Transistor
Q4	2SC2404-CD	Transistor	Q2	2SC2412K7QRS	Transistor
R1	YF2116103JT	Carbon 10K ohms 1/16W			
R2	YF2116682JT	Carbon 6.8K ohms 1/16W	D1,2	MA151K	Diode
R3	YF2116112JT	Carbon 1.1K ohms 1/16W	R1	YF2116222GT	Carbon 2.2K ohms 1/16W
			R2	YF2116103JT	Carbon 10K ohms 1/16W
R4	YF2116682JT	Carbon 6.8K ohms 1/16W	R3	YF2116105GT	Carbon 1M ohms 1/16W
R5	YF2116221JT	Carbon 220 ohms 1/16W	R4,5	YF2116223GT	Carbon 22K ohms 1/16W
R6	YF2116332JT	Carbon 3.3K ohms 1/16W			
R7	YF2116472JT	Carbon 4.7K ohms 1/16W	R6	YF2116562JT	Carbon 5.6K ohms 1/16W
R8	YF2116223JT	Carbon 22K ohms 1/16W	R7	YF2116223JT	Carbon 22K ohms 1/16W
			R8	YF2116153JT	Carbon 15K ohms 1/16W
R9	YF2116472GT	Carbon 4.7 ohms 1/16W	R9	YF2116303GT	Carbon 30K ohms 1/16W
R10	YF2116432GT	Carbon 4.3K ohms 1/16W	R10	YF2116104JT	Carbon 100K ohms 1/16W
R12,13	YF2116104JT	Carbon 100K ohms 1/16W	R11	YF2116223JT	Carbon 22K ohms 1/16W
R14	YF2116182GT	Carbon 1.8K ohms 1/16W	R12	YF2116222GT	Carbon 2.2K ohms 1/16W
			R13	YF2116102GT	Carbon 1K ohms 1/16W
R15	YF2116122JT	Carbon 1.2K ohms 1/16W			
R16,17	YF2116152JT	Carbon 1.5K ohms 1/16W			
R18,19	YF2116272JT	Carbon 2.7K ohms 1/16W			
R20	YF2116561JT	Carbon 560 ohms 1/16W			
R21,22	YF2116391JT	Carbon 390 ohms 1/16W			

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
R14	YF2116223JT	Carbon 22K ohms 1/16W	Q34	2SD602-QRS	Transistor
C1	ECEA1HKS2R2	Electrolytic 2.2 μ F 50V	Q35	2SD1257A-PQ	Transistor
C2-4	ECEA1AKS470	Electrolytic 47 μ F 10V	Q36	2SA1037K7QRS	Transistor
C5	YF400560CHJT	Ceramic 56 pF	Q37,38	2SC2412K7QRS	Transistor
C6	YF400102CHJT	Ceramic 1000 pF	Q39-43	2SB814-QRS	Transistor
CN1(E1)	YFIH10206	6 pin BI Connector	Q44	2SC2412K7QRS	Transistor
CN2(E2)	YFIH1020-10	10 pin BI Connector	Q45,46	2SA1037K7QRS	Transistor
			Q47,48	2SC2412K7QRS	Transistor
			Q49-55	2SB814-QRS	Transistor
PROCESS VIC-13, VIC-14 BOARD			Q56	2SC2412K7QRS	Transistor
PCB9-13,14	o YFVKE00V3P1A	Printed Circuit Board Assy	Q57	2SA1037K7QRS	Transistor
IC1	MN3801	IC	Q58,59	2SC2412K7QRS	Transistor
R1	YF2116103JT	Carbon 10K ohms 1/16W	Q60,61	2SB814-QRS	Transistor
C1	ECEA1AKS470	Electrolytic 47 μ F 10V	Q64	2SB814-QRS	Transistor
C2	YF400104FZT	Ceramic 0.1 μ F	Q65	2SD973-QRS	Transistor
C3-6	YF400103FZT	Ceramic 0.01 μ F	Q66	2SB793-QRS	Transistor
C7	YF400103XMT	Ceramic 0.01 μ F	Q67	YF2SB953A-PQ	Transistor
L1	YFNL45T2R2K	Coil 2.2 μ H	Q68	2SD973-QRS	Transistor
CN1(E1)	YFIH10206	6 pin BI Connector	Q69	2SB793-QRS	Transistor
			Q70	2SB929-PQ	Transistor
			Q71	2SA1037K7QRS	Transistor
			Q72	2SB710-QRS	Transistor
			Q73	2SC2412K7QRS	Transistor
			Q74-76	2SA1037K7QRS	Transistor
DEFLECTION BOARD			D1	MA151K-TW	Diode
PCB10	o YFVKZ00V3P1A	Printed Circuit Board Assy	D2	DA204KT7	Diode
IC1	NJM3415D	IC	D3-5	MA151K-TW	Diode
IC2	NJM3415M	IC	D6	05Z2.7	Diode
IC3	NJM4558M	IC	D7	MA151K-TW	Diode
IC4	NJM2904M	IC	D8	MA4068M	Diode
IC5	NJM4558M	IC	D9	MA151K-TW	Diode
IC6	NJM2048MC	IC	D10	MA151WK-TW	Diode
IC7	NJM2903M	IC	D11	MA151K-TW	Diode
Q1	2SC2412K7QRS	Transistor	D12-14	MA157TW	Diode
Q2	2SB710-QRS	Transistor	D15,16	EK14	Diode
Q3	2SD602-QRS	Transistor	D17	DA204KT7	Diode
Q4	2SD1083	Transistor	D18,19	MA151K	Diode
Q5,6	2SA1037K7QRS	Transistor	R1,2	YF2116562JT	Carbon 5.6K ohms 1/16W
Q7	2SC2412K7QRS	Transistor	R3	YF2116152JT	Carbon 1.5K ohms 1/16W
Q8	2SA1037K7QRS	Transistor	R4	YF2116102GT	Carbon 1K ohms 1/16W
Q9	2SD1083	Transistor	R5,6	YF2116103JT	Carbon 10K ohms 1/16W
Q10	2SA1037K7QRS	Transistor	R7	YF2116151JT	Carbon 150 ohms 1/16W
Q11	2SC2412K7QRS	Transistor	R8	ERD50TJ270	Carbon 27 ohms 1/2W
Q12	2SA1037K7QRS	Transistor	R9	YF2116274JT	Carbon 270K ohms 1/16W
Q13	2SC2412K7QRS	Transistor	R10	YF2116392JT	Carbon 3.9K ohms 1/16W
Q14	2SA1037K7QRS	Transistor	R11	ER0S2CKF4701	Metal 4.7K ohms 1/8W
Q15	2SD1083	Transistor	R12	YF2116152JT	Carbon 1.5K ohms 1/16W
Q16-20	2SC2412K7QRS	Transistor	R13	YF2116151JT	Carbon 150 ohms 1/16W
Q21-23	2SA1037K7QRS	Transistor	R14	YF2116153JT	Carbon 15K ohms 1/16W
Q24-26	2SC2412K7QRS	Transistor	R15	YF2116472JT	Carbon 4.7K ohms 1/16W
Q27	2SA1037K7QRS	Transistor	R16	YF2116152JT	Carbon 1.5K ohms 1/16W
Q28	2SC2412K7QRS	Transistor	R17	YF2116390JT	Carbon 39 ohms 1/16W
Q29	2SA1037K7QRS	Transistor	R18	YF2116223JT	Carbon 22K ohms 1/16W
Q30	2SC2412K7QRS	Transistor	R19	YF2116362JT	Carbon 3.6K ohms 1/16W
Q31	2SD602-QRS	Transistor	R20	2116150JT	Carbon 15 ohms 1/16W
Q32	2SC2412 K7 QRS	Transistor			
Q33	2SA1037K7QRS	Transistor			

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R21	YF2116102GT	Carbon	1K ohms 1/16W	R79,80	YF2116563JT	Carbon	56K ohms 1/16W
R22	YF2116683GT	Carbon	68K ohms 1/16W	R81	YF2116222GT	Carbon	2.2K ohms 1/16W
R23	YF2116102GT	Carbon	1K ohms 1/16W	R82	YF2116563JT	Carbon	56K ohms 1/16W
R24	YF2116222GT	Carbon	2.2K ohms 1/16W	R83,84	YF2116103JT	Carbon	10K ohms 1/16W
R25	YF2116223JT	Carbon	22K ohms 1/16W				
R26	YF2116272JT	Carbon	2.7K ohms 1/16W	R85	YF2116512JT	Carbon	5.1K ohms 1/16W
R27	YF2116393GT	Carbon	39K ohms 1/16W	R86	YF2116303GT	Carbon	30K ohms 1/16W
R28	YF2116472JT	Carbon	4.7K ohms 1/16W	R87	YF2116223JT	Carbon	22K ohms 1/16W
R29	YF2116222GT	Carbon	2.2K ohms 1/16W	R88	YF2116563JT	Carbon	56K ohms 1/16W
R30	YF2116682JT	Carbon	6.8K ohms 1/16W	R89	YF2116224JT	Carbon	220K ohms 1/16W
R31	YF2116681JT	Carbon	680 ohms 1/16W	R90	YF2116152JT	Carbon	1.5K ohms 1/16W
R32	YF2116102GT	Carbon	1K ohms 1/16W	R91	YF2116684JT	Carbon	680K ohms 1/16W
R33	YF2116100JT	Carbon	10 ohms 1/16W	R92	YF2116392JT	Carbon	3.9K ohms 1/16W
R34	YF2116274JT	Carbon	270K ohms 1/16W	R93	YF2116103JT	Carbon	10K ohms 1/16W
R35	YF2116392JT	Carbon	3.9K ohms 1/16W	R94	YF2116272JT	Carbon	2.7K ohms 1/16W
R36	ER0S2CKF4701	Metal	4.7K ohms 1/8W	R95,96	YF2116512JT	Carbon	5.1K ohms 1/16W
R37	YF2116152JT	Carbon	1.5K ohms 1/16W	R97	YF2116103JT	Carbon	10K ohms 1/16W
R38	YF2116151JT	Carbon	150 ohms 1/16W	R98	YF2116512JT	Carbon	5.1K ohms 1/16W
R39	YF2116682JT	Carbon	6.8K ohms 1/16W	R99	YF2116274JT	Carbon	270K ohms 1/16W
R40	YF2116103JT	Carbon	10K ohms 1/16W	R100	YF2116563JT	Carbon	56K ohms 1/16W
R41	YF2116562JT	Carbon	5.6K ohms 1/16W	R101	YF2116303GT	Carbon	30K ohms 1/16W
R42	YF2116472JT	Carbon	4.7K ohms 1/16W	R102	YF2116102GT	Carbon	1K ohms 1/16W
R43	YF2116152JT	Carbon	1.5K ohms 1/16W	R103	YF2116153JT	Carbon	15K ohms 1/16W
R44	YF2116390JT	Carbon	39 ohms 1/16W	R104	YF2116682JT	Carbon	6.8K ohms 1/16W
R45,46	YF2116821GT	Carbon	820 ohms 1/16W	R105	YF2116223JT	Carbon	22K ohms 1/16W
R47	YF2116752JT	Carbon	7.5K ohms 1/16W	R106	YF2116102GT	Carbon	1K ohms 1/16W
R48	YF2116822JT	Carbon	8.2K ohms 1/16W	R107,108	YF2116103JT	Carbon	10K ohms 1/16W
R49	YF2116102GT	Carbon	1K ohms 1/16W	R109	YF2116332JT	Carbon	3.3K ohms 1/16W
R50	YF2116472JT	Carbon	4.7K ohms 1/16W	R110	YF2116222GT	Carbon	2.2K ohms 1/16W
R51	YF2116103JT	Carbon	10K ohms 1/16W	R111	YF2116153JT	Carbon	15K ohms 1/16W
R52	YF2116223JT	Carbon	22K ohms 1/16W	R112	YF2116103JT	Carbon	10K ohms 1/16W
R53	YF2116821GT	Carbon	820 ohms 1/16W	R113	YF2116163JT	Carbon	16K ohms 1/16W
R54	YF2116393GT	Carbon	39K ohms 1/16W	R114	YF2116472JT	Carbon	4.7K ohms 1/16W
R55	YF2116222GT	Carbon	2.2K ohms 1/16W	R115,116	YF2116103JT	Carbon	10K ohms 1/16W
R56	YF2116682JT	Carbon	6.8K ohms 1/16W	R117	YF2116912JT	Carbon	9.1K ohms 1/16W
R57	YF2116472JT	Carbon	4.7K ohms 1/16W	R118	YF2116123JT	Carbon	12K ohms 1/16W
R58	YF2116681JT	Carbon	680 ohms 1/16W	R119	YF2116103JT	Carbon	10K ohms 1/16W
R59	YF2116102GT	Carbon	1K ohms 1/16W	R120	YF2116122JT	Carbon	1.2K ohms 1/16W
R60	YF2116274JT	Carbon	270K ohms 1/16W	R121	YF2116562JT	Carbon	5.6K ohms 1/16W
R61	YF2116392JT	Carbon	3.9K ohms 1/16W	R122	YF2116202JT	Carbon	2K ohms 1/16W
R62	ER0S2CKF4701	Metal	4.7K ohms 1/8W	R123	YF2116222GT	Carbon	2.2K ohms 1/16W
R63	YF2116152JT	Carbon	1.5K ohms 1/16W	R124	YF2116681JT	Carbon	680 ohms 1/16W
R64	YF2116151JT	Carbon	150 ohms 1/16W	R125,126	YF2116223JT	Carbon	22K ohms 1/16W
R65	YF2116682JT	Carbon	6.8K ohms 1/16W	R127	YF2116153JT	Carbon	15K ohms 1/16W
R66	YF2116103JT	Carbon	10K ohms 1/16W	R128	YF2116103JT	Carbon	10K ohms 1/16W
R67	YF2116472JT	Carbon	4.7K ohms 1/16W	R129	YF2116222GT	Carbon	2.2K ohms 1/16W
R68	YF2116152JT	Carbon	1.5K ohms 1/16W	R130	YF2116272JT	Carbon	2.7K ohms 1/16W
R69	YF2116562JT	Carbon	5.6K ohms 1/16W	R131	YF2116682JT	Carbon	6.8K ohms 1/16W
R70	YF2116390JT	Carbon	39 ohms 1/16 W	R132	YF2116391JT	Carbon	390 ohms 1/16W
R71,72	YF2116153JT	Carbon	15K ohms 1/16W	R136	YF2116103JT	Carbon	10K ohms 1/16W
R73	YF2116273JT	Carbon	27K ohms 1/16W	R137	YF2116562JT	Carbon	5.6K ohms 1/16W
R74	YF2116272JT	Carbon	2.7K ohms 1/16W	R138	YF2116103JT	Carbon	10K ohms 1/16W
R75	YF2116103JT	Carbon	10K ohms 1/16W	R139	YF2116122JT	Carbon	1.2K ohms 1/16W
R76	YF2116563JT	Carbon	56K ohms 1/16W	R140	YF2116222GT	Carbon	2.2K ohms 1/16W
R77	YF2116103JT	Carbon	10K ohms 1/16W	R141	YF2116153JT	Carbon	15K ohms 1/16W
R78	YF2116153JT	Carbon	15K ohms 1/16W	R142,143	YF2116273JT	Carbon	27K ohms 1/16W
				R144,145	YF2116222GT	Carbon	2.2K ohms 1/16W

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R146	YF2116154JT	Carbon	150K ohms 1/16W	R221	ERD10TJ470	Carbon	47 ohms 1/8W
R147	YF2116393GT	Carbon	39K ohms 1 / 16 W	VR1	YFH0643C100	Variable Resistor	10 ohms
R148	YF2116301JT	Carbon	300 ohms 1/16W	VR2	YFH0643C10K	Variable Resistor	10K ohms
				VR3	YFCT-6V103	Variable Resistor	10K ohms
R149	YF2116152JT	Carbon	1.5K ohms 1/16W	VR4-6	YFH0643C10K	Variable Resistor	10K ohms
R150	YF2116472JT	Carbon	4.7K ohms 1/16W	VR7	YFH0643C100	Variable Resistor	100 ohms
R151	YF21165R6JT	Carbon	5.6 ohms 1/16W	VR8	YFH0643C10K	Variable Resistor	10K ohms
R152	YF2116103JT	Carbon	10K ohms 1/16W				
R153	YF2116562JT	Carbon	5.6K ohms 1/16W	VR9	YFCT-6V103	Variable Resistor	10K ohms
				VR10,11	YFH0521A10K	Variable Resistor	10K ohms
R154	YF2116103JT	Carbon	10K ohms 1/16W	VR12	YFH0643C2R2K	Variable Resistor	2.2K ohms
R155	YF2116122JT	Carbon	1.2K ohms 1/16W	VR13	YFH0643C100	Variable Resistor	100 ohms
R156	YF2116152JT	Carbon	1.5K ohms 1/16W	VR14	YFH0643C10K	Variable Resistor	10K ohms
R157	YF2116223JT	Carbon	22K ohms 1/16W				
R158	YF2116393GT	Carbon	39K ohms 1/16W	VR15	YFCT-6V103	Variable Resistor	10K ohms
				VR16	YFH0521A10K	Variable Resistor	10K ohms
R159	YF2116273JT	Carbon	27K ohms 1/16W	VR17-19	YFH0643C2R2M	Variable Resistor	2.2M ohms
R160	YF2116103JT	Carbon	10K ohms 1/16W	VR20-22	YFH0521A2R2M	Variable Resistor	2.2M ohms
R161	YF2116223JT	Carbon	22K ohms 1/16W	VR23-25	YFH0521A1M	Variable Resistor	1M ohms
R162-164	YF2116103JT	Carbon	10K ohms 1/16W				
R165	YF2116333GT	Carbon	33K ohms 1/16W	VR29	YFH0521A33K	Variable Resistor	33K ohms
				VR30	YFH0521A10K	Variable Resistor	10K ohms
R166	YF2116562JT	Carbon	5.6K ohms 1/16W	VR31	YWH0621A22K	Variable Resistor	22K ohms
R167	YF2116103JT	Carbon	10K ohms 1/16W	VR32	YFH0521A10K	Variable Resistor	10K ohms
R168	YF2116223JT	Carbon	22K ohms 1/16W	VR33	YFH0521A15K	Variable Resistor	15K ohms
R169	YF2116103JT	Carbon	10K ohms 1/16W				
R170	YF2116562JT	Carbon	5.6K ohms 1/16W	VR34	YFH0521A10K	Variable Resistor	10K ohms
				VR35	YFH0521A100	Variable Resistor	100 ohms
R171	YF2116122JT	Carbon	1.2K ohms 1/16W	Z1	YFFCR-0014	Block Resistor	
R172	YF2116103JT	Carbon	10K ohms 1/16W	C1	YF400471SLKT	Ceramic	470 pF
R173	YF2116222GT	Carbon	2.2K ohms 1/16W	C2	YF400470SLKT	Ceramic	47 pF
R174	YF2116183GT	Carbon	18K ohms 1/16W	C3	ECEA1AKK100	Electrolytic	10 μ F 10V
R175	YF2116303GT	Carbon	30K ohms 1/16W				
				C4	ECEA1AU101	Electrolytic	100 μ F 10V
R176	YF2116273JT	Carbon	27K ohms 1/16W	C5	ECQP1272JZ	Plastic	2700 pF 100V
R182		Carbon	360K ohms 1/16W	C6-9	ECEA1AF470	Electrolytic	47 μ F 10V
R183	YF2116105GT	Carbon	1M ohms 1/16W	C10	YF400471SLJT	Ceramic	470 pF
R184	YF2116623JT	Carbon	62K ohms 1/16W	C11	oECQV1H104JZ	Plastic	0.1 μ F 50V
R185	YF2116154JT	Carbon	150K ohms 1/16W				
R186	YF2116104JT	Carbon	100K ohms 1/16W	C12	ECSF1AE226	Electrolytic	22 μ F 10V
R190	YF2116332JT	Carbon	3.3K ohms 1/16W	C13,14	ECEA0JKS330	Electrolytic	33 μ F 6.3V
R191	ERD 10TJ102	Carbon	1K ohms 1/8W	C15	ECEA1HKS010	Electrolytic	1 μ F 50V
R192	YF2116332JT	Carbon	3.3K ohms 1/16W	C16	ECEA1EK3R3	Electrolytic	3.3 μ F 25V
R193	ERD10TJ102	Carbon	1K ohms 1/8W	C17	ECEA1EF2R2	Electrolytic	2.2 μ F 25V
R194,195	YF2116273JT	Carbon	27K ohms 1/16W				
				C18	ECEA1AU470	Electrolytic	47 μ F 10V
R196	YF2116470JT	Carbon	47 ohms 1/16W	C19,20	ECEA1EKK2R2	Electrolytic	2.2 μ F 25V
R197	YF2116101JT	Carbon	100 ohms 1/16W	C21	ECEA1AU470	Electrolytic	47 μ F 10V
R198,199	YF2116333GT	Carbon	33K ohms 1/16W	C22	ECEA1AU221	Electrolytic	220 μ F 10V
R200	YF2116471JT	Carbon	470 ohms 1/16W	C23	ECQP1272JZ	Plastic	2700 pF 100V
R201	YF2116473GT	Carbon	47K ohms 1/16W				
				C24-27	ECEA1AF470	Electrolytic	47 μ F 10V
R202	YF2116183GT	Carbon	18K ohms 1/16W	C28	YF400471SLJT	Ceramic	470 pF
R203	YF2116682JT	Carbon	6.8K ohms 1/16W	C29	oECQV1H104JZ	Plastic	0.1 μ F 50V
R204	YF2116471JT	Carbon	470 ohms 1/16W	C30,31	ECEA1AKN100	Electrolytic	10 μ F 10V
R205,206	YF2116103JT	Carbon	10K ohms 1/16W	C32,33	ECEA1AU470	Electrolytic	47 μ F 10V
R207	YF2116331JT	Carbon	330 ohms 1/16W				
				C34	ECEA0JKS330	Electrolytic	33 μ F 6.3V
R208	YF2116222GT	Carbon	2.2K ohms 1/16W	C35-38	YF426103XMS	Ceramic	0.01 μ F
R209	YF2116223JT	Carbon	22K ohms 1/16W	C39,40	ECEA1AKS220	Electrolytic	22 μ F 10V
R210	YF2116154JT	Carbon	150K ohms 1/16W	C41	ECQP1272JZ	Plastic	2700 pF 100V
R211	YF2116102GT	Carbon	1K ohms 1/16W	C42-45	ECEA1AF470	Electrolytic	47 μ F 10V
R212	YF2116222GT	Carbon	2.2K ohms 1/16W				
				C46	YF400471SLJT	Ceramic	470 pF
R213,216	YF2116101JT	Carbon	100 ohms 1/16W	C47	oECQV1H104JZ	Plastic	0.1 μ F 50V
R217-219	YF2116102GT	Carbon	1K ohms 1/16W	C48	ECEA1AU470	Electrolytic	47 μ F 10V
R220	ERD10TJ560	Carbon	56 ohms 1/8W	C49	ECEA1AKK100	Electrolytic	10 μ F 10V

SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
C50	YF426473XMS	Ceramic	0.047 μ F 50V	L12	YFPF331K	Coil	330 μ H
C51	YF426103XMS	Ceramic	10000 pF 50V	L13,14	YFPC470K	Coil	47 μ H
C52	ECEA1AU471	Electrolytic	470 μ F 10V	L15	YFPF101K	Coil	100 μ H
C53	ECQB1H103JZ	Plastic	0.01 μ F 50V				
C54-56	ECEA1HKN010	Electrolytic	1 μ F 50V	T1	ETF16L26A	Flyback Transformer	
C57	ECEA1EKN4R7	Electrolytic	4.7 μ F 25V	SW1	YWSSS322	Slide Switch	
				SW2	SSS342L4N	Slide Switch	
C58	ECEA1HKN010	Electrolytic	1 μ F	F1	YFSP73A	Current Fuse	3A
C59	ECEA1AKK100	Electrolytic	10 μ F 10V	F2	YFSP71A	Current Fuse	1A
C60	YF426104XKS	Ceramic	0.1 μ F				
C61-63	ECEA0JKS470	Electrolytic	47 μ F 6.3V	F3	YFSP73A	Current Fuse	3A
C64	ECEA1CU101	Electrolytic	100 μ F 16V	J133-135	ERJ8GCS0R00	Jumper Resistor	
				CN1-JF	YFZC014	14 pin Jack Female	
C65	ECEA0JU470	Electrolytic	47 μ F 6.3V	CN2-JF	YFZC016	16 pin Jack Female	
C66	ECEA1AKK100	Electrolytic	10 μ F 10V	CN3-JM	EMCS0750Z	7 pin Jack Male	
C67	ECQP1682JZ	Plastic	6800 pF 100V				
C68	ECEA1AU471	Electrolytic	470 μ F 10V	CN4-JM	EMCS0550Z	5 pin Jack Male	
C69,70	ECEA2AU100	Electrolytic	10 μ F 100V	CN5-JM	EMCS0550Z	5 pin Jack Male	
				CN6-JM	S5PS2T2EF	5 pin Jack Male	
C71	ECEB2VS010	Electrolytic	1 μ F 350V	CN7-JM	YFS8PS2T2EF	8 pin Jack Male	
C72	YFB3DD152K	Ceramic	1500 pF 2KV	CN8-JM	S3PS2T2EF	3 pin Jack Male	
C76	YFB3AD152M	Ceramic	1500 pF 1KV				
C77	ECEA0JKS470	Electrolytic	47 μ F 6.3V	CN9,13-JM	S4PS2T2EF	4 pin Jack Male	
C78	ECEA2AU2R2	Electrolytic	2.2 μ F 100V	CN14-JM	S4PS2T2EF	4 pin Jack Male	
C79	ECEA0JKS470	Electrolytic	47 μ F 6.3V	M115	YFV2HA0287A3	Shield	
C80	YF426251XMS	Ceramic	250 pF	M116	YFV2HA0288A3	Shield Parts	
C81,82	o YFMMH25CK473	Plastic	0.047 μ F				
C83	ECEA2AU2R2	Electrolytic	2.2 μ F 100V	M117	YFV2HA0289A3	Shield Parts	
C84	o YFMMH25CK473	Plastic	0.047 μ F	M118	YFV2HA0312A3	Shield Parts	
C85	ECEA2AU010	Electrolytic	1 μ F 100V	M119	YFV2HA0291A3	Shield Parts	
				M120	YFV7DA0033A4	Heat Sink	
C86	YF400471SLKT	Ceramic	470 pF				
C87	ECEA2AU010	Electrolytic	1 μ F 100V				
C88	ECEA0JKS330	Electrolytic	33 μ F 6.3V				
C89	YF400103XMT	Ceramic	0.01 μ F				
C90	ECEA2AU2R2	Electrolytic	2.2 μ F 100V				
C91	ECSF1VE335	Tantalum	3.3 μ F 35V	PCB11	o YFVKY00V3P3A	Printed Circuit Board Assy	
C92	ECEA1EF220	Electrolytic	22 μ F 25V	IC1-3	NJM3415D	IC	
C93,94	400562XMT	Ceramic	5600 pF	R3,8	EROS2CKF10R0	Carbon	10 ohms 1/8W
C95	ECEA1CSS221	Electrolytic	220 μ F 16V	R14	EROS2CKF10R0	Carbon	10 ohms 1/8W
C96	YF400331CHJT	Ceramic	330 pF	VR1	YFCT-6H202	Variable Resistor 2K ohms	
C97	ECEA1AF101V	Electrolytic	100 μ F 10V	VR2	YFH0642C2R2K	Variable Resistor	2.2K ohms
C98	ECEA1CU471	Electrolytic	470 μ F 16V	VR3	YFCT-6H202	Variable Resistor	2K ohms
C99	ECEA1AF101V	Electrolytic	100 μ F 10V	VR4	YFH0642C2R2K	Variable Resistor	2.2K ohms
C100	ECEA1AU470	Electrolytic	47 μ F 10V	VR5	YFCT-6H202	Variable Resistor	2K ohms
C101	ECEA1HS010S	Electrolytic	1 μ F 50V	C1	ECEA1AU331	Electrolytic	330 μ F 10V
C102,103	ECEA1AKK100	Electrolytic	10 μ F 10V	C2	o YF426822XKT	Ceramic	8200 pF
C104	ECEA1AU222	Electrolytic	2200 μ F 10V	C3	ECQV1H334JZ	Plastic	0.33 μ F 50V
C105-107	YF400560SLJT	Ceramic	56 pF	C4	ECEA1ASS101	Electrolytic	100 μ F 10V
C108	ECEA1HKS010	Electrolytic	1 μ F 50V	C5	o YF426822XKT	Ceramic	8200 pF
				C6	o ECQV1H104JZ	Plastic	0.1 μ F 50V
L1	YFLH103JZ	Coil	10 μ H	C7	ECEA1AU471	Electrolytic	470 μ F 10V
L2	YFVL303	Coil	30 μ H	C8	o YF426822XKT	Ceramic	8200 pF
L3	YFLH333JZ	Coil	33 μ H	C9	o ECQV1H104JZ	Plastic	0.1 μ F 50V
L4	YFLH103JZ	Coil	10 μ H	CN1(E1)	YFIH1020-10	10 pin Jack Female	
L5	YFVL303	Coil	30 μ H	CN2(E2)	YFIH1020-10	10 pin Jack Female	
				CN3(E3)	YF1H1020-9	9 pin Jack Female	
L6	YFLH333JZ	Coil	33 μ H				
L7	YFLH103JZ	Coil	10 μ H				
L8	YFVL303	Coil	30 μ H				
L9	YFLH333JZ	Coil	33 μ H				
L10	YFPC470K	Coil	47 μ H				
L11	YF15PF331K	Coil	330 μ H				

DEFLECTION VIC BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
CAPACITOR BOARD					
PCB12 C1	oYFVKZ00V3P7A YFFA1A223Z	Printed Circuit Board Assy Electrolytic 0.022 μ F 10V	R178 R181 R182 R187 VR1 Z1 Z2	YF2116105GT YF2116823JT YF2116223JT YF2116103JT EVN8ACA00B13 YFRKM10L104F YFRMLS8822J	Carbon 1M ohms 1/16W Carbon 82K ohms 1/16W Carbon 22K ohms 1/16W Carbon 10K ohms 1/16W Variable Resistor 1K ohms Block Resistor Block Resistor
AUTO A BOARD					
PCB13 IC18 IC19,20 IC21 IC22 IC25-30 IC31 Q25 Q27,28 Q29-32 Q33-38 D12,13 D14,16 D17 D19,20 D22,23 R105-107 R108 R109 R113 R114,115 R116 R117 R128,129 R130 R131,132 R133 R134 R135 R136 R137 R138 R139 R140 R141 R142 R143,144 R145 R146 R147 R148 R149 R150 R151-154 R155-166 R171 R172 R173 R174 R175 R176,177	oYFVKB00V3E5A MN1237B TC40H374F YFUPD7516HG1 NJM3414M AN90B82S NJM4558M 2SA1022-BC 2SC2412K7QRS 2SA1037K7QRS 2SC2412K7QRS DAN202KT7 MA151KTW DAN202KT7 MA151KTW MA165 YF2116222GT YF2116682JT YF2116222GT YF2116102GT YF2116223JT YF2116103JT YF2116562JT YF2116562JT YF2116154JT YF2116563JT YF2116101JT YF2116472JT YF2116103JT YF2116753JT YF2116102GT YF2116472JT YF2116103JT YF2116153JT YF2116104GT YF2116223JT YF2116103JT YF2116563JT YF2116223JT YF2116563JT YF2116104JT YF2116223JT YF2116104JT YF2116223JT YF2116104JT YF2116102GT YF2116473GT YF2116362JT YF2116104JT YF2116223JT YF2116103JT	Printed Circuit Board Assy LSI IC IC IC IC IC Transistor Transistor Transistor Transistor Diode Diode Diode Diode Diode Carbon 2.2K ohms 1/16W Carbon 6.8K ohms 1/16W Carbon 2.2K ohms 1/16W Carbon 1K ohms 1/16W Carbon 22K ohms 1/16W Carbon 10K ohms 1/16W Carbon 5.6K ohms 1/16W Carbon 5.6K ohms 1/16W Carbon 150K ohms 1/16W Carbon 56K ohms 1/16W Carbon 100 ohms 1/16W Carbon 4.7K ohms 1/16W Carbon 10K ohms 1/16W Carbon 75K ohms 1/16W Carbon 1K ohms 1/16W Carbon 4.7K ohms 1/16W Carbon 10K ohms 1/16W Carbon 15K ohms 1/16W Carbon 100K ohms Carbon 22K ohms 1/16W Carbon 10K ohms 1/16W Carbon 56K ohms 1/16W Carbon 22K ohms 1/16W Carbon 56K ohms 1/16W Carbon 100K ohms 1/16W Carbon 22K ohms 1/16W Carbon 100K ohms 1/16W Carbon 22K ohms 1/16W Carbon 100K ohms 1/16W Carbon 1K ohms 1/16W Carbon 47K ohms 1/16W Carbon 3.6K ohms 1/16W Carbon 100K ohms 1/16W Carbon 22K ohms 1/16W Carbon 10K ohms 1/16W	C24 C25 C26 C27 C28 C40,41 C42 C46 C51 SW1 X1 BAT1 CN1 CN2 CN3 CN4 CN5	ECSF1AE475 ECEA0JKS470 ECSF1AE475 ECEA0JS221 YF400470CHJT YF426224FZS ECEA0JSN470 oYFCSC300K YF426473XKS YFSSS312L2N YFCSA6.55MT BR2325-1HM YF30SDD4TS11 YFFPC19 SS1T1 YFFPC10SS1T1 YFS6PS2T2EF S4PS2T2EF	Electrolytic 4.7 μ F 10V Electrolytic 47 μ F 6.3V Electrolytic 4.7 μ F 10V Electrolytic 220 μ F 6.3V Ceramic 47 pF Ceramic 0.22 μ F 50V Electrolytic 47 μ F 6.3V Ceramic Ceramic 0.047 μ F 50V Slide Switch Crystal Oscillator Battery 30 pin Connector 19 pin Connector 10 pin Connector 6 pin Connector 4 pin Connector
			AUTO B BOARD		
			PCB14 IC1 IC2 IC3 IC4 IC5 IC6 IC7,8 IC9 IC10 IC11 IC12 IC24 Q1,2 Q3 Q4 Q5 Q6 Q9 Q10-13 Q14 Q15-18 Q19,20 Q21-25 Q39 D1 D2 D3 D4	oYFVKC00V3E5A NJM592M8 NJM4558M NJU4053BM NJM062M NJM319M BA226AF M51325P NJU4053BM NJM2904M NJU4053BM NJM2903M BA226AF 2SC2412K7QRS 2SC2404QRSTW 2SA1037K7QRS 2SA1022-CD 2SC2412K7QRS 2SA1037K7QRS 2SC2412K7QRS 2SA1037K7QRS 2SC2412K7QRS 2SA1037K7QRS 2SC2412K7QRS 2SC1684 1SS141 MA151K 1SS141 DAN202KT7	Printed Circuit Board Assy IC IC IC IC IC IC IC IC IC IC IC IC Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Transistor Diode Diode Diode Diode

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
D5	DAP202KT7	Diode	R62,63	YF2116470JT	Carbon 47 ohms 1/16W
D6,7	DA204KT7	Diode	R64,65	YF2116101JT	Carbon 100 ohms 1/16W
			R66,67	YF2116563JT	Carbon 56K ohms 1/16W
D8	MA151KTW	Diode	R68	YF2116103JT	Carbon 10K ohms 1/16W
D9	1SS99	Diode	R69	YF2116563JT	Carbon 56K ohms 1/16W
D10,11	MA151KTW	Diode			
D18	MA151KTW	Diode	R70,71	YF2116103JT	Carbon 10K ohms 1/16W
D21	MA165	Diode	R72,73	YF2116473GT	Carbon 47K ohms 1/16W
			R74	YF2116681JT	Carbon 680 ohms 1/16W
R1	YF2116102GT	Carbon 1K ohms 1/16W	R75	YF2116473GT	Carbon 47K ohms 1/16W
R2	YF2116561JT	Carbon 560 ohms 1/16W	R76	YF2116681JT	Carbon 680 ohms 1/16W
R3	YF2116822JT	Carbon 8.2K ohms 1/16W			
			R77	YF2116222GT	Carbon 2.2K ohms 1/16W
R4	YF2116122JT	Carbon 1.2K ohms 1/16W	R78	YF2116472JT	Carbon 4.7K ohms 1/16W
R5	YF2116562JT	Carbon 5.6K ohms 1/16W	R79	YF2116112GT	Carbon 1.1K ohms 1/16W
R6	YF2116105GT	Carbon 1M ohms 1/16W	R80	YF2116222GT	Carbon 2.2K ohms 1/16W
R7	YF2116103JT	Carbon 10K ohms 1/16W	R81	YF2116472JT	Carbon 4.7K ohms 1/16W
R8	YF2116223JT	Carbon 22K ohms 1/16W			
			R82	YF2116112GT	Carbon 1.1K ohms 1/16W
R9,10	YF2116563JT	Carbon 56K ohms 1/16W	R83,84	YF2116681JT	Carbon 680 ohms 1/16W
R11	YF2116103JT	Carbon 10K ohms 1/16W	R85-87	YF2116103JT	Carbon 10K ohms 1/16W
R12	YF2116102GT	Carbon 1K ohms 1/16W	R88,89	YF2116224JT	Carbon 220K ohms 1/16W
R13	YF2116562JT	Carbon 5.6K ohms 1/16W	R90	YF2116273JT	Carbon 27K ohms 1/16W
R14,15	YF2116563JT	Carbon 56K ohms 1/16W			
			R91	YF2116103JT	Carbon 10K ohms 1/16W
R16	YF2116682JT	Carbon 6.8K ohms 1/16W	R92	YF2116223JT	Carbon 22K ohms 1/16W
R17	YF2116102GT	Carbon 1K ohms 1/16W	R93	YF2116224JT	Carbon 220K ohms 1/16W
R20	YF2116303GT	Carbon 30K ohms 1/16W	R94,95	YF2116104JT	Carbon 100K ohms 1/16W
R21	YF2116562JT	Carbon 5.6K ohms 1/16W	R96-98	YF2116103JT	Carbon 10K ohms 1/16W
R22	YF2116103JT	Carbon 10K ohms 1/16W			
			R99	YF2116105GT	Carbon 1M ohms 1/16W
R25	YF2116563JT	Carbon 56K ohms 1/16W	R101	YF2116273JT	Carbon 27K ohms 1/16W
R26	YF2116394JT	Carbon 390K ohms 1/16W	R102	YF2116104JT	Carbon 100K ohms 1/16W
R27	YF2116304JT	Carbon 300K ohms 1/16W	R103	YF2116223JT	Carbon 22K ohms 1/16W
R28	YF2116562JT	Carbon 5.6K ohms 1/16W	R104	YF2116103JT	Carbon 10K ohms 1/16W
R29	YF2116823JT	Carbon 82K ohms 1/16W			
			R167	YF2116363JT	Carbon 36K ohms 1/16W
R30,31	YF2116563JT	Carbon 56K ohms 1/16W	R168,169	YF2116563JT	Carbon 56K ohms 1/16W
R32	YF2116562JT	Carbon 5.6K ohms 1/16W	R170	YF2116474JT	Carbon 470K ohms 1/16W
R33	YF2116222GT	Carbon 2.2K ohms 1/16W	R174	YF2116220JT	Carbon 22 ohms 1/16W
R34	YF2116223JT	Carbon 22K ohms 1/16W	R175	YF2116104JT	Carbon 100K ohms 1/16W
R35	YF2116562JT	Carbon 5.6K ohms 1/16W			
			R179	YF2116333GT	Carbon 33K ohms 1/16W
R36,37	YF2116223JT	Carbon 22K ohms 1/16W	R180	YF2116682JT	Carbon 6.8K ohms 1/16W
R38	YF2116103JT	Carbon 10K ohms 1/16W	R184	YF2116223JT	Carbon 22K ohms 1/16W
R39	YF2116473GT	Carbon 47K ohms 1/16W	VR2	YWH0651A680K	Variable Resistor 680K ohms
R40	YF2116223JT	Carbon 22K ohms 1/16W	VR3	YWH0651A470K	Variable Resistor 470K ohms
R41	YF2116392JT	Carbon 3.9K ohms 1/16W			
			C1	ECEA1HKS2R2	Electrolytic 2.2 μ F 50V
R42	YF2116222GT	Carbon 2.2K ohms 1/16W	C2	YF400332XKT	Ceramic 3300 pF
R43	YF2116122JT	Carbon 1.2K ohms 1/16W	C3	YF400102XKT	Ceramic 1000 pF
R44,45	YF2116222GT	Carbon 2.2K ohms 1/16W			
R46	YF2116153JT	Carbon 15K ohms 1/16W	C4,5	ECQM1H104JZ	Plastic 0.1 μ F 50V
R47	YF2116563JT	Carbon 56K ohms 1/16W	C6	YF400561SLKT	Ceramic 560 pF
			C7	YF400221CHJT	Ceramic 220 pF
			C9	YF400681SLJT	Ceramic 680 pF
R48,49	ERD10TJ124	Carbon 120K ohms 1/8W	C10	YF400222XKT	Ceramic 2200 pF
R50	YF2116332JT	Carbon 3.3K ohms 1/16W			
R51	YF2116473GT	Carbon 47K ohms 1/16W	C11	YF400103XKT	Ceramic 0.01 μ F
R52	YF2116822JT	Carbon 8.2K ohms 1/16W	C12-17	YF426104DMS	Ceramic 0.1 μ F 50V
R53	YF2116105GT	Carbon 1M ohms 1/16W	C18,19	YF400101SLKT	Ceramic 100 pF
			C20	YF426104DMS	Ceramic 0.1 μ F 50V
			C21,22	ECEA1HKS010	Electrolytic 1 μ F 50V
R54,55	YF2116223JT	Carbon 22K ohms 1/16W			
R56	YF2116104JT	Carbon 100K ohms 1/16W	C23	ECQM1H104JZ	Plastic 0.1 μ F 50V
R57	YF2116562JT	Carbon 5.6K ohms 1/16W	C43	ECEA0JKS470	Electrolytic 47 μ F 6.3V
R58	YF2116101JT	Carbon 100 ohms 1/16W	C44	ECEA0JKS101	Electrolytic 100 μ F 6.3V
R59-61	YF2116222GT	Carbon 2.2K ohms 1/16W	C45	ECEA1AKS470	Electrolytic 47 μ F 10V

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
C47	YF400102XKT	Ceramic 1000 pF	IC2	MN74HC4050S	IC
C50	ECSF0GE685	Tantalum 6.8 μ F 4V	IC3	MN74HC221S	IC
C52	ECQM1H333KZ	Plastic 0.033 μ F 50V	IC4	MN74HC107S	IC
C53,54	YF400103XKT	Ceramic 0.01 μ F	IC5	MB84066BF	IC
C57	ECEA0JKS101	Electrolytic 100 μ F 6.3V	IC6	MN74HC221S	IC
L1	EL05SI8R2K	Coil 8.2 μ H	IC7	MB84066BF	IC
L2	EL05SI101K	Coil 100 μ H	IC8	MN74HC4049S	IC
L3	EL05SI391K	Coil 390 μ H	Q1~4	2SC2412K7QRS	Transistor
BAT1	BR2325-1HM	Battery	Q5	2SA1037K7QRS	Transistor
CN6	YF30PAD4T1PK	30 pin Connector	Q6	2SC2412K7QRS	Transistor
CN7	YFFPC11SS1T1	11 pin Connector	Q7	2SA1037K7QRS	Transistor
AUTO C BOARD			Q8	2SC2404-CD	Transistor
PCB15	oYFVKY00V3P6A	Printed Circuit Board Assy	Q9~12	2SC2412K7QRS	Transistor
IC13,14	NJU4051BM	IC	D1,2	MA328	Diode
IC15-17	YFNJM064M	IC	D3	DAN202KT7	Diode
C29-39	YF426104DMS	Ceramic 0.1 μ F 50V	R1	YF2116102GT	Carbon 1K ohms 1/16W
MOTHER BOARD			R2	YF2116332GT	Carbon 3.3K ohms 1/16W
PCB16	oYFVKY00V3E4A	Printed Circuit Board Assy	R3	YF2116561JT	Carbon 560 ohms 1/16W
R1-4	ERD10TJ562	Carbon 5.6K ohms 1/8W	R4	YF2116222GT	Carbon 2.2K ohms 1/16W
R5	ERD10TJ124	Carbon 120K ohms 1/8W	R5	YF2116104JT	Carbon 100K ohms 1/16W
R6	ERD10TJ680	Carbon 68 ohms 1/8W	R6	YF2116562JT	Carbon 5.6K ohms 1/16W
R7	ERD10TJ180	Carbon 18 ohms 1/8W	R7	YF2116561JT	Carbon 560 ohms 1/16W
R8	ERD10TJ750	Carbon 75 ohms 1/8W	R8	YF2116102GT	Carbon 1K ohms 1/16W
CN4	YFFPC19SS1T1	19 pin Connector	R9	YF2116222GT	Carbon 2.2K ohms 1/16W
CN5	YFFPC11SS1T1	11 pin Connector	R10	YF2116561JT	Carbon 560 ohms 1/16W
CN6	S4PS2T2EF	4 pin Connector	R11,12	YF2116333GT	Carbon 33K ohms 1/16W
CN10	YFS7PS2T2EF	7 pin Connector	R13	YF2116222GT	Carbon 2.2K ohms 1/16W
CN11	S4PS2T2EF	4 pin Connector	R14	YF2116123GT	Carbon 12K ohms 1/16W
CN13	YFS7PS2T2EF	7 pin Connector	R16	YF2116103JT	Carbon 10K ohms 1/16W
CN14,15	YFS6PS2T2EF	6 pin Connector	R17	YF2116432GT	Carbon 4.3K ohms 1/16W
CN17	YFS8PS2T2EF	8 pin Connector	R18	YF2116563JT	Carbon 56K ohms 1/16W
CN18	S5PS2T2EF	5 pin Connector	R19	YF2116103JT	Carbon 10K ohms 1/16W
CN20,21	S2PS2T2EF	2 pin Connector	R20,21	YF2116102GT	Carbon 1K ohms 1/16W
MOTHER VIC 1 BOARD			R23	YF2116301JT	Carbon 300 ohms 1/16W
PCB16-1	YFVKC00V3P7A	Printed Circuit Board Assy	R24	YF2116433GT	Carbon 43K ohms 1/16W
IC1	NJM2903M	IC	R25	YF2116102GT	Carbon 1K ohms 1/16W
R1	YF2116562JT	Carbon 5.6K ohms 1/16W	R26	YF2116203GT	Carbon 20K ohms 1/16W
R2~5	YF2116103JT	Carbon 10K ohms 1/16W	R27,28	YF2116392JT	Carbon 3.9K ohms 1/16W
R6	YF2116562JT	Carbon 5.6K ohms 1/16W	R29	YF2116104JT	Carbon 100K ohms 1/16W
R7~10	YF2116103JT	Carbon 10K ohms 1/16W	R30~33	YF2116332JT	Carbon 3.3K ohms 1/16W
C1,2	YF400472XMT	Ceramic 4700PF	R34	YF2116223JT	Carbon 22K ohms 1/16W
CN19-JM	YF1H10208	8 Pin Jack Male	R35	YF2116332JT	Carbon 3.3K ohms 1/16W
SYNC BOARD			R36	YF2116102GT	Carbon 1K ohms 1/16W
PCB17	oYFVKB00V3E7A	Printed Circuit Board Assy	R37,38	YF2116222GT	Carbon 2.2K ohms 1/16W
IC1	MN6160PBS	IC	R39	YF2116562JT	Carbon 5.6K ohms 1/16W
			R40	YF2116182GT	Carbon 1.8K ohms 1/16W
			R41,42	YF2116272JT	Carbon 2.7K ohms 1/16W
			R43	YF2116562JT	Carbon 5.6K ohms 1/16W
			R44	YF2116182GT	Carbon 1.8K ohms 1/16W
			R45	YF2116562JT	Carbon 5.6K ohms 1/16W
			R46	YF2116222GT	Carbon 2.2K ohms 1/16W
			C1	YF2116103JT	Carbon 10K ohms 1/16W
			C2,4	ECEA0JKS101	Electrolytic 100 μ F 6.3V
			C5	YF400103XMT	Ceramic 0.01 μ F
				YF426014DMS	Ceramic 0.1 μ F 50V

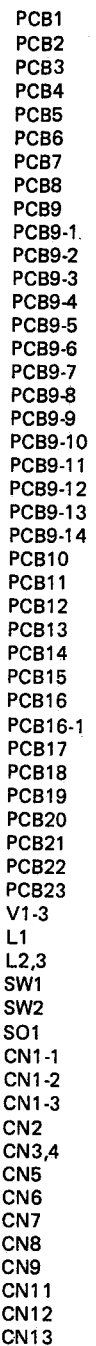
SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
C6	YF400103XMT	Ceramic	0.01 μ F	D7	MA157TW	Diode	
C8	YF400150CHJT	Ceramic	15 PF	D9	MA151K-TW	Diode	
C9	YF400103XMT	Ceramic	0.01 μ F	D10	MA157TW	Diode	
C10	ECEA1HSN010	Electrolytic	1 μ F 50V	R1	YF2116393GT	Carbon	39K ohms 1/16W
C11	YF400151CHJT	Ceramic	150 PF				
C12	YF400103XMT	Ceramic	0.01 μ F	R2	YF2116103JT	Carbon	10K ohms 1/16W
C13	YF426104DMS	Ceramic	0.1 μ F 50V	R3	YF2116563JT	Carbon	56K ohms 1/16W
C14	ECQP1H102GZ	Plastic	1000 PF 50V	R4	YF2116103JT	Carbon	10K ohms 1/16W
C15	YF400271CHJT	Ceramic	270 PF	R5	ERJ8GCSG821	Carbon	820 ohms 1/16W
C16	ECQP1H102GZ	Plastic	1000 PF 50V	R6	YF21162R2JT	Carbon	2.2 ohms 1/16W
C17,18	YF426104DMS	Ceramic	0.1 μ F 50V	R7	YF2116334JT	Carbon	330K ohms 1/16W
C19	ECEA0JS221	Electrolytic	220 μ F 6.3V	R8	YF2116203JT	Carbon	20K ohms 1/16W
C20~22	YF400103XMT	Ceramic	0.01 μ F	R9	YF2116124GT	Carbon	120K ohms 1/16W
C23	YF426104DMS	Ceramic	0.1 μ F 50V	R10	YF2116103JT	Carbon	10K ohms 1/16W
C24	ECQM1H104JZ	Plastic	0.1 μ F 50V	R11	YF2116183GT	Carbon	18K ohms 1/16W
C25	ECQP1H102GZ	Plastic	1000 PF 50V	R12,13	YF2116103JT	Carbon	10K ohms 1/16W
C26	YF400270CHJT	Ceramic	27 PF	R14	YF2116153JT	Carbon	15K ohms 1/16W
C27	YF426104DMS	Ceramic	0.1 μ F 50V	R15,16	YF2116203JT	Carbon	20K ohms 1/16W
C28,29	YF400103XMT	Ceramic	0.01 μ F	R17	YF2116153JT	Carbon	15K ohms 1/16W
C30	YF400152XKT	Ceramic	1500 PF	R18,19	YF2116103JT	Carbon	10K ohms 1/16W
CT1	YFTZ03R200FR	Trimmer Capacitor	20 PF	R20	YF2116274JT	Carbon	270K ohms 1/16W
L1,2	EL05S1100K	Coil	10 μ H	R21	YF2116334JT	Carbon	330K ohms 1/16W
L3	EL05S1471K	Coil	470 μ H	R22	YF2116104JT	Carbon	100K ohms 1/16W
L4	F051054	Coil		R23	YF2116134GT	Carbon	130K ohms 1/16W
X1	YFMS30917R7M	Crystal Oscillator		R24	YF2116104JT	Carbon	100K ohms 1/16W
J15,22	YF21160R00T	Jumper Resistor		R25	YF2116114JT	Carbon	110K ohms 1/16W
CN7~9-JM	YFIH10208	8 Pin Jack Male		R26,27	YF2116222GT	Carbon	2.2K ohms 1/16W
M121	YFV2HA0292A3	Shield Case		R28,29	YF2116223JT	Carbon	22K ohms 1/16W
M122	YFV2HA0293A3	Shield Cover A		R30	YF2116104JT	Carbon	100K ohms 1/16W
M123	YFV2HA0294A3	Shield Cover B		R31	YF2116304JT	Carbon	300K ohms 1/16W
LENS CONTROL BOARD				R32,33	YF2116562JT	Carbon	5.6K ohms 1/16W
				R34,35	YF2116561JT	Carbon	560 ohms 1/16W
				R36	YF2116105GT	Carbon	1M ohms 1/16W
				R37	YF2116104JT	Carbon	100K ohms 1/16W
				R38	YF2116103JT	Carbon	10K ohms 1/16W
				R39	YF2116105GT	Carbon	1M ohms 1/16W
				R40	YF2116104JT	Carbon	100K ohms 1/16W
				R41	YF2116473GT	Carbon	47K ohms 1/16W
				R42	YF2116105GT	Carbon	1M ohms 1/16W
				R43	YF2116104JT	Carbon	100K ohms 1/16W
PCB18	o YFVKB00V3P4A	Printed Circuit Board Assy		R44	YF2116563JT	Carbon	56K ohms 1/16W
IC1	NJM2902M	IC		R45,46	YF2116474JT	Carbon	470K ohms 1/16W
IC2	BA6218	IC		R47	YF2116104JT	Carbon	100K ohms 1/16W
IC3	NJM2903M	IC		R48	YF2116473GT	Carbon	47K ohms 1/16W
IC4	NJM4558M	IC		R49	YF2116154JT	Carbon	150K ohms 1/16W
IC5	NJU4053BM	IC		R50	YF2116151JT	Carbon	150 ohms 1/16W
IC6	NJM3414M	IC		R51	YF2116223GT	Carbon	22K ohms 1/16W
Q1,2	2SC2412K7QRS	Transistor		R52	YF2116153JT	Carbon	15K ohms 1/16W
Q3	2SC1383-PQ	Transistor		R53	YF2116102GT	Carbon	1K ohms 1/16W
Q4	2SB710-QRS	Transistor		R54	YF2116103JT	Carbon	10K ohms 1/16W
Q5	2SB709-QRS	Transistor		R55	YF2116331JT	Carbon	330 ohms 1/16W
Q6-8	2SD601-QRS	Transistor		R56	YF2116822JT	Carbon	8.2K ohms 1/16W
D1	MA4091-H	Diode		R57	YF2116222GT	Carbon	2.2K ohms 1/16W
D2	MA151K-TW	Diode		R58	YF2116242GT	Carbon	2.4K ohms 1/16W
D3	MA151WK-TW	Diode		R59	YF2116392JT	Carbon	3.9K ohms 1/16W
D4	MA151K-TW	Diode					
D5	MA157TW	Diode		R60	YF2116152JT	Carbon	1.5K ohms 1/16W
D6	MA151K-TW	Diode		R61	YF2116153JT	Carbon	15K ohms 1/16W

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
R62	YF2116472JT	Carbon 4.7K ohms 1/16W	Q3	2SB709-QRS	Transistor
R63	YF2116223JT	Carbon 22K ohms 1/16W	Q4	2SD601-QRS	Transistor
R64	YF2116752JT	Carbon 7.5K ohms 1/16W	R1,2	YFLP162KGT53	Carbon 3300 ppm
VR1	YWH0621A4R7K	Variable Resistor 4.7K ohms	R3,4	YF2116333GT	Carbon 33K ohms 1/16W
VR2	YFH0621A220K	Variable Resistor 220K ohms	R5	YF2116102GT	Carbon 1K ohms 1/16W
C1	ECEA1EU470	Electrolytic 47 μ F 25V	R6,7	YFLP162KGT53	Carbon 3300PPM
C2	ECEA1CU101	Electrolytic 1 μ F 50V	R8	YF2116333GT	Carbon 33K ohms 1/16W
C3,4	YF426104DMS	Ceramic 0.1 μ F 50V	R9	YF2116102GT	Carbon 1K ohms 1/16W
C5-8	ECEA1AU470	Electrolytic 47 μ F 10V	R10	YF2116333GT	Carbon 33K ohms 1/16W
C9	ECEA1HN010S	Electrolytic 1 μ F 50V	R11	YF2116333GT	Carbon 33K ohms 1/16W
C10	YF426102CHJS	Ceramic 1000 pF 50V	R12	YF2116183GT	Carbon 18K ohms 1/16W
C11	YF400104XKT	Ceramic 0.1 μ F	R13	YF2116333GT	Carbon 33K ohms 1/16W
C12	YF426104DMS	Ceramic 0.1 μ F 50V	R14	YF2116183GT	Carbon 18K ohms 1/16W
C13	YF426473XMS	Ceramic 0.047 μ F 50V	R18,19	YF2116102GT	Carbon 1K ohms 1/16W
C14	YF426332XMS	Ceramic 3300 pF	R20	YF2116511JT	Carbon 510 ohms 1/16W
CN1-JM	S4PS2T2EF	4 pin Jack Male	R21	YF2116392JT	Carbon 3.9K ohms 1/16W
CN2-JM	S2PS2T2EF	2 pin Jack Male	R22,23	YF2116102GT	Carbon 1K ohms 1/16W
CN3-JM	EMCS0850Z	8 pin Jack Male	R25	YF2116752JT	Carbon 7.5K ohms 1/16W
CN4-JM	S2PS2T2EF	2 pin Jack Male	R26	YF2116392GT	Carbon 3.9K ohms 1/16W
CN5-JM	S3PS2T2EF	3 pin Jack Male	R27	YF2116151GT	Carbon 150 ohms 1/16W
CN6-JM	S4PS2T2EF	4 pin Jack Male	R29	YF2116331GT	Carbon 330 ohms 1/16W
M98	YFV2SA0197A4	Mounting Angle	R30	YF2116221JT	Carbon 220 ohms 1/16W
ZOOM SWITCH BOARD			R31	YF2116752JT	Carbon 7.5K ohms 1/16W
PCB19	o YFVKC00V3P4A	Printed Circuit Board Assy	R32	YF2116242GT	Carbon 2.4K ohms 1/16W
VS1	YF0H003HQRTW	Semiconductor	R33,34	YF2116102GT	Carbon 1K ohms 1/16W
REC SWITCH BOARD			VR1,2	EVM13SW00B14	Variable Resistor 10K ohms
PCB20	o YFVKZ00V3PAA	Printed Circuit Board Assy	VR4	EVM13SW00B14	Variable Resistor 10K ohms
SW1	YFSPH222B	Push Switch	VR5	EVM13SW00BQ4	Variable Resistor 47K ohms
IRIS VR BOARD			C1	ECEA0JKS330	Electrolytic 33 μ F 6.3V
PCB21	o YFVKZ00V3P8A	Printed Circuit Board Assy	C2,3	ECEA1AKS470	Electrolytic 47 μ F 10V
R1	ERD10TJ153	Carbon 15K ohms 1/8W	J24	YF21160R00T	Jumper Resistor
R2	ERD10TJ472	Carbon 4.7K ohms 1/8W	CN1-JM	ILFPC7SS1L1	7 pin Jack Male
R3	ERD10TJ154	Carbon 150K ohms 1/8W	1.5" EVF. MISCELLANEOUS		
VR1	YFK111A-10KB	Variable Resistor 10K ohms	V101	40JB4	Cathode Ray Tube
VR2	YWH0621A22K	Variable Resistor 22K ohms	L101	ELY15V113C	Deflection Coil Assy
RETURN BOARD			CN101	E8-130J-602	8 pin Cable Connector
PCB22	o YFVKZ00V3P9A	Printed Circuit Board Assy	CN102	YFS7506P625	CRT Socket
SW1	YFSPH222A	Push Switch	M2	o YFV5WA0236A4	Panel
ATW BOARD			M4	o YFV5EA0328B2	Upper Cover
PCB23	o YFVKY00V3P9A	Printed Circuit Board Assy	M6	YFV5EA0329B2	Bottom Cover
IC1	NJM2902M	IC	M7	o YFV5EA0330A2	CRT Upper Cover
IC2	NJM3414M	IC	M8	o YFV5EA0331A2	CRT Bottom Cover
Q1	2SB709-QRS	Transistor	M9	YFV5RA0035A4	Knob for Tally Switch
Q2	2SD601-QRS	Transistor	M11	YFV1UA0004A4	EVF Mirror
			M12	o YFV9AA0276AN	EVF Lens Assy
			M13	YFV2FA0014B4	Cushion Rubber for CRT
			M14	YFV2FA0049B4	Cushion for CRT Bottom Cover
			M15	YFV2FA0053A4	Cushion for CRT Upper Cover
			M16	YFV4JA0049A4	Spring for Turning Stopper
			M17	YFV4JA0059A4	Spring for Open and Shut
			M18	YFV4JA0098A4	Spring
			M19	YFV2VA0010A4	Barrier
			M20	YFNA326PB-9	Badge for WV-VF34E
				YFNA317NB-10	Badge for WV-VF34N

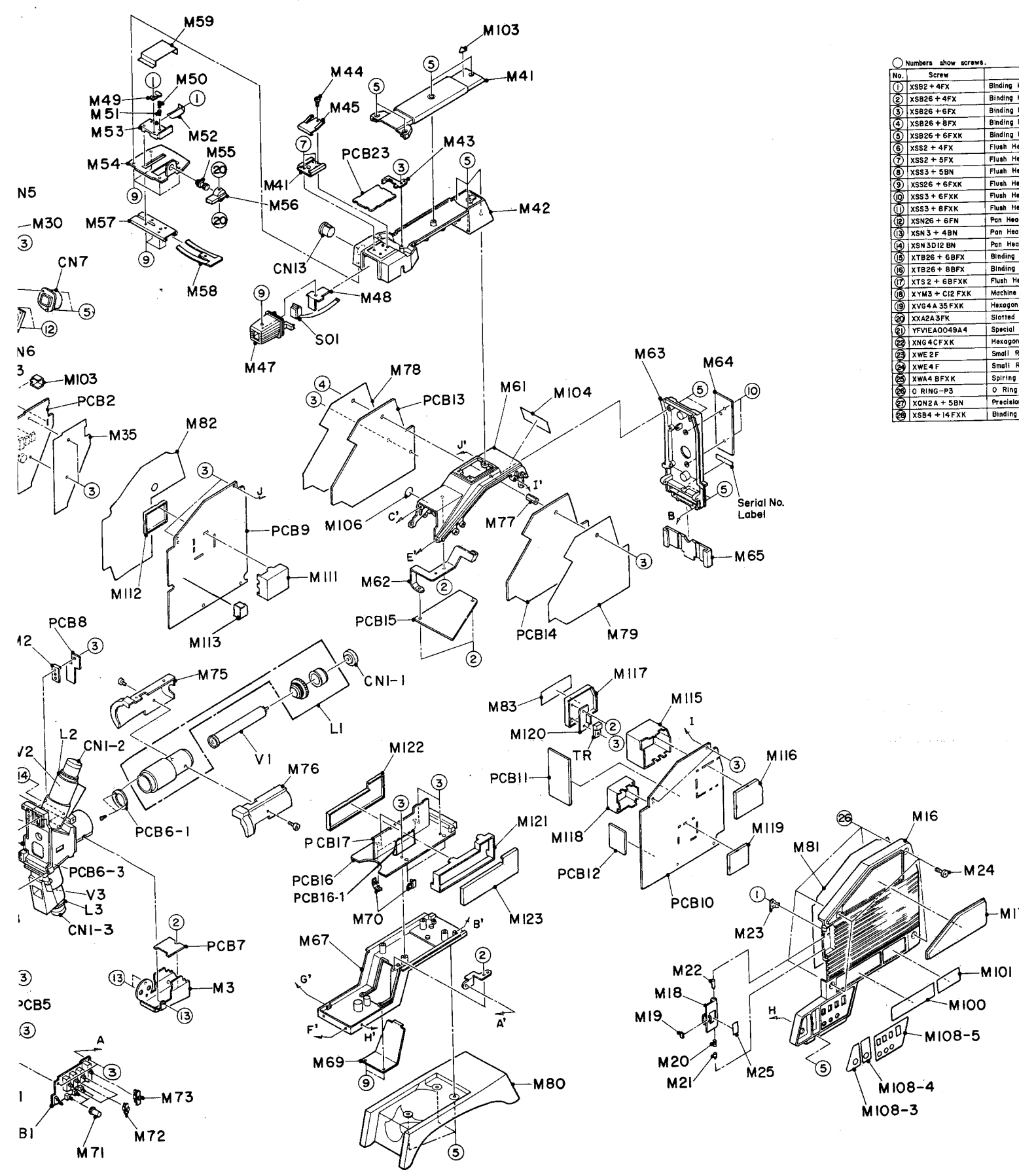
SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
M21	YWS-WULRB03	High Voltage Safety Label for WV-VF34N	C2	ECEA1AF101V	Electrolytic 100 μ F 10V
	YFV7WA0057A4	High Voltage Safety Label for WV-VF34E	C3	ECEA1CKS100	Electrolytic 10 μ F 16V
M22	YWS-XEGRB03A	X Ray Label	C4	ECEA1HSN010	Electrolytic 1 μ F 50V
M23	YWS-WULRB03	Serviceman Caution Label for WV-VF34E	C5	ECEA1AKS470	Electrolytic 47 μ F 10V
M24	YFV7MA0099A4	UL Caution Label for WV-VF34N	C6	ECQM1H684JZ	Plastic 0.68 μ F 50V
			C7	ECQV1H224JZ	Plastic 0.22 μ F 50V
			C8	ECQP1152JZ	Plastic 1500 pF 100V
M25	oYFV7QA0858A4	Main Label for WV-VF34N	C9	ECEA1CKS100	Electrolytic 10 μ F 16V
	oYFV7QA0860A4	Main Label for WV-VF34E	C10	YF400223XKT	Ceramic 0.022 μ F
			C11	YF400152XKT	Ceramic 1500 pF
			C12	ECEA1AU470	Electrolytic 47 μ F 10V
			C13	YF400241CHJT	Ceramic 240 pF
M27	YFV1FA0008A4	Nut Plate	C14	ECEA10Z100	Electrolytic 100 μ F 10V
M28	oYFV2EA0032A4	Guide Plate	C15	ECQP1562JZ	Plastic 5600 pF 100V
M29	oYFV3FA0026A4	Control Ring	C16	ECEA1AU221	Electrolytic 220 μ F 10V
M30	oYFV5GA0038A4	Eye Cap	C17	ECEA1HU100	Electrolytic 10 μ F 50V
M31	oYFV3CA0062A3	Eye Cap Holder	C18	ECQV1H823JZ	Plastic 0.082 μ F
EVF BOARD			C20,21	YFB3AD152M	Ceramic 1500 pF 50V
PCB1	oYFVKA00V3E6A	Printed Circuit Board Assy	C23	ECEA1ASU471	Electrolytic 470 μ F 10V
IC1	NJM3414M	IC	C24	ECEA1EK4R7	Electrolytic 4.7 μ F 25V
IC2	AN2510S	IC	C25	YF400473FZT	Ceramic 0.047 μ F
Q1	2SC2412K7QRS	Transistor	L1	ELH5L62	Coil
Q2	2SD973-QRS	Transistor	L2	YFVFSIZEC01L	Coil
			L3	YFVC101J	Coil 100 μ H
Q3	2SB710-QRS	Transistor	T1	HIPAKEV FV3	Flyback Transformer
Q5	2SD602-QRS	Transistor	J33	ERD25TC0	Jumper Resistor
Q7	2SB709AQRS	Transistor	CN1-JM	EMCS0550Z	5 pin Jack Male
Q8	2SD1083	Transistor	CN2-JM	S2PS2T2EF	2 pin Jack Male
D1	MA165	Diode	CN3-JM	EMCS0350Z	3 pin Jack Male
D2-4	LN21RPH	LED Red	CN4-JM	YFS7PS2T2EF	7 pin Jack Male
R1	YF2116223JT	Carbon 22K ohms 1/16W	CN5-JM	EMCS0450Z	4 pin Jack Male
R3	YF2116123GT	Carbon 12K ohms 1/16W	E1	YFIH10207	10 pin Connector
R4	YF2116153JT	Carbon 15K ohms 1/16W	EVF TALLY SWITCH BOARD		
R5	YF2116103JT	Carbon 10K ohms 1/16W	PCB2	oYFVKZ00V3PBA	Printed Circuit Board Assy
R6	YF2116222GT	Carbon 2.2K ohms 1/16W	SW1	YWSSS322	Slide Switch
R7	YF2116562JT	Carbon 5.6K ohms 1/16W	EVF VR BOARD		
R8	YF2116563JT	Carbon 56K ohms 1/16W	PCB3	oYFVKZ00V3P6A	Printed Circuit Board Assy
R10	2116152GT	Carbon 1.5K ohms 1/16W	R9	ERD10TJ334	Carbon 330K ohms 1/8W
R11	YF2116302GT	Carbon 3K ohms 1/16W	R19	ERD10TJ472	Carbon 4.7K ohms 1/8W
R12	YF21164R7JT	Carbon 4.7 ohms 1/16W	R20	ERD10TJ103	Carbon 10K ohms 1/8W
R13	YF2116561JT	Carbon 560 ohms 1/16W	R27	ERD10TJ105	Carbon 1M ohms 1/8W
R15	YF2116512JT	Carbon 5.1K ohms 1/16W	VR3	EVUF2AE04B53	Variable Resistor 5K ohms
R16	YF2116623JT	Carbon 62K ohms 1/16W	VR4	EVUF2AE04B55	Variable Resistor 500K ohms
R17	YF2116222GT	Carbon 2.2K ohms 1/16W	C22	ECCF1H181J	Ceramic 180 pF 50V
R18	YF2116512JT	Carbon 5.1K ohms 1/16W	MICROPHONE		
R21	YF2116102GT	Carbon 1K ohms 1/16W	M199	YFM6CA0044A4	Wind-Screen
R24	YF2116222GT	Carbon 2.2K ohms 1/16W	M201	WM-4067	Microphone Unit
R25	YF2116182GT	Carbon 1.8K ohms 1/16W			
R26	YF2116223JT	Carbon 22K ohms 1/16W			
R28	ERD25TJ565	Carbon 5.6M ohms 1/4W			
R29	ERD25TJ545	Carbon 5.4M ohms 1/4W			
R30-32	2116910JT	Carbon 91 ohms 1/16W			
R33,34	YF2116104JT	Carbon 100K ohms 1/16W			
R35	ERD25TJ100	Carbon 10 ohms 1/4W			
VR1	YWH0651A100	Variable Resistor 100 ohms			
VR2	EVN8ACA00BQ3	Variable Resistor 4.7K ohms			
VR5	YWH0651A1M	Variable Resistor 1M ohms			
VR6	EVM45GA00BV6	Variable Resistor			
C1	ECEA1AU470	Electrolytic 47 μ F 10V			

SYM-BOL NO.	PART NO.	DESCRIPTION	SYM-BOL NO.	PART NO.	DESCRIPTION
ZOOM LENS					
M201	oYF401402	Lens Unit			
M202	oYF616129	Zoom Lever			
M203	oYF401442	Iris Cover			
M204	oYF401437	Manual Knob Assy			
M205	oYF401441	Iris Assy			
M206	oYF401438	Zoom Motor Assy			
M207	oYF401443	Master Lens Assy			
M208	oYF401432	Control Ring			
M209	oYF401433	Lens Mounting			
ACCESSORY PARTS/PACKAGING PARTS					
M150	oYFV8SA0013AN	Support Bracket			
M151	oYFV8QA0856AN	Operating Instruction for VW-V3N Series			
	oYFV8QA0857AN	Operating Instruction for WV-V3E Series			
M152	19998700331	Warranty Card for WV-V3EB			
	19998700419	Warranty Card for WV-V3EG			
	YFV8UA0064A4	Warranty Card for WV-V3NA			
M153	YWV22XPR99K	Service Center List			
M155	YFV8RA0011A3	Registration Chart			
M159	YWV2300RB02	Color Chart			
M160	YWT10X16C03	Polyethylene Bag for Support Bracket			
M161	XZB26X40C05	Polyethylene Bag for WV-V3E Series			
	XZB55X71C1	Polyethylene Bag for WN-N3 Series			
M159	YWT100X120X1	Polyethylene Bag for Carrying Case			
M160	oXZB55X71C1	Polyethylene Bag for Camera			
M161	WV-CC35PU	Carrying Case			
M162	oYFV9CD0675AN	Packaging for WV-V3E Series			
	oYFV9CE0675AN	Packaging for WV-V3N Series			

Numbers show screws.		
No.	Screw	Description
1	XSB2 + 4FX	Binding Head Screws
2	XSB26 + 4FX	Binding Head Screws
3	XSB28 + 6FX	Binding Head Screws
4	XSB26 + 8FX	Binding Head Screws
5	XSB26 + 6FXK	Binding Head Black Screws
6	XSS2 + 4FX	Flush Head Machine Screws
7	XSS2 + 5FX	Flush Head Machine Screws
8	XSS3 + 5BN	Flush Head Machine Screws
9	XSS26 + 6FXK	Flush Head Machine Black Screws
10	XSS3 + 6FXK	Flush Head Machine Black Screws
11	XSS3 + 8FXK	Flush Head Machine Black Screws
12	XSN26 + 6FN	Pan Head Machine Screws
13	XSN3 + 4BN	Pan Head Machine Screws
14	XSN30I2BN	Pan Head Machine Screws
15	XTB26 + 6BFX	Binding Head Tapping Screws
16	XTB26 + 8BFX	Binding Head Tapping Screws
17	XTS2 + 6BFXK	Flush Head Machine Black Screws
18	XYM3 + C12 FXK	Machine Screws and Washer Assembly
19	XVG44 + 35 FXK	Hexagon Head Bolts
20	XXA2A3FK	Slotted Set Screws
21	YFVIEAOQ49A4	Special Screws
22	XNG42FXK	Hexagon Head Nut
23	XWE2 F	Small Round Plain Washer
24	XWE4 F	Small Round Plain Washer
25	XWA4 BFXK	Spiral Lock Washer
26	O RING-P3	O Ring
27	XQNZ2 + 5BN	Precision Pan Head Screws
28	XSb4 + 14FXK	Binding Head Black Screws



EXPLODED VIEW OF CAMERA (WV-V3)



Numbers show screws.

No.	Screw	Description
①	XSB2 + 4FX	Binding Head Screws
②	XSB26 + 4FX	Binding Head Screws
③	XSB26 + 6FX	Binding Head Screws
④	XSB26 + 8FX	Binding Head Screws
⑤	XSB26 + 6FXK	Binding Head Block Screws
⑥	XSS2 + 4FX	Flush Head Machine Screws
⑦	XSS2 + 6FX	Flush Head Machine Screws
⑧	XSS3 + 5BN	Flush Head Machine Screws
⑨	XSS26 + 6FXK	Flush Head Machine Block Screws
⑩	XSS3 + 6FXK	Flush Head Machine Block Screws
⑪	XSS3 + 8FXK	Flush Head Machine Block Screws
⑫	XSN26 + 6FN	Pan Head Machine Screws
⑬	XSN3 + 4BN	Pan Head Machine Screws
⑭	XSN3D12 BN	Pan Head Machine Screws
⑮	XTB26 + 6BFX	Binding Head Tapping Screws
⑯	XTB26 + 8BFX	Binding Head Tapping Screws
⑰	XTS2 + 6BFXK	Flush Head Machine Block Screws
⑱	XYM3 + C12 FXX	Machine Screws and Washer Assembly
⑲	XV6A35 FXX	Hexagon Head Bolts
⑳	XXA2A3FK	Slotted Set Screws
㉑	YFVIA0049A4	Special Screws
㉒	XNG4CFXX	Hexagon Head Nut
㉓	XWE2F	Small Round Plain Washer
㉔	XWE4F	Small Round Plain Washer
㉕	XWA4 BFXK	Springs Lock Washer
㉖	O RING-P3	O Ring
㉗	XON2A + 5BN	Precision Pan Head Screws
㉘	XSB4 + 14FXK	Binding Head Block Screws

PCB1	Selection Switch Board	M1	YFTV406A-2	M48	YFV2SA0198A4
PCB2	Audio Board	M2	YFV2NA0051A4	M49	YFV2CA0091A4
PCB3	LED Board	M3	YFV2HA0281A4	M50	YFV4JA0100A4
PCB4	Front Switch (A) Board	M4	YFV1HA0017A4	M51	YFV1HA0011A4
PCB5	Front Switch (B) Board	M5	YFVAKA0423AN	M52	YFV4JA0101A4
PCB6	Pre-pre Amplifier Board	M6	YFV5EA0324B1	M53	YFV2CA0090A4
PCB7	Preamplifier Board	M7	YFV2NA0052A4	M54	YFV2EA0033A4
PCB8	Filter Sensor Board	M8	YFV2NA0053A4	M55	YFV1EA0048A4
PCB9	Process Board	M9	YFV1KA0030A4	M56	YFV4RA0012A4
PCB9-1	Process VIC 1 Board	M10	YFV2SA0210A4	M57	YFV5MA0019A4
PCB9-2	Process VIC 2 Board	M11	YFV2SA0205A4	M58	YFV4JA0102A4
PCB9-3	Process VIC 3 Board	M12	YFV6JA0026A4	M61	YFV5EA0319B1
PCB9-4	Process VIC 4 Board	M13	YFV4JA0103A4	M62	YFV2SA0203A4
PCB9-5	Process VIC 5 Board	M15	YFV9AA0275AN	M63	YFV5EA0320B1
PCB9-6	Process VIC 6 Board	M16	YFV5EB0321B1	M64	YFV2EB0028B4
PCB9-7	Process VIC 7 Board	M17	YFV5VA0039A4	M65	YFV5EA0323A4
PCB9-8	Process VIC 8 Board	M18	YFV5EB0322A4	M67	YFV5EA0318B1
PCB9-9	Process VIC 9 Board	M19	YFV2FA0105A4	M68	YFV2SA0206A4
PCB9-10	Process VIC 10 Board	M20	YFV4JA0106A4	M69	YFV5EA0333A4
PCB9-11	Process VIC 11 Board	M21	YFV1HA0019A4	M70	YFV2EA0021A3
PCB9-12	Process VIC 12 Board	M22	ZPL16A8WV	M71	YFV5RA0061A4
PCB9-13	Process VIC 13 Board	M23	YFV4JA0105A4	M72	YFV5RA0065A4
PCB9-14	Process VIC 14 Board	M24	YFV1EA0036A4	M73	YFV5RA0062A4
PCB10	Deflection Board	M25	YFV7SA0184B5	M75	YFV2HA0319A4
PCB11	Deflection VIC Board	M26	YFV5EB0325B1	M76	YFV2HA0320A4
PCB12	Capacitor Board	M27	YFV5DB0026A2	M77	YFV2NA0066A4
PCB13	Auto A Board	M28	YFV5EA0341A4	M78	YFV2HA0317A4
PCB14	Auto B Board	M30	YFV2SA0200A4	M79	YFV2HA0318A4
PCB15	Auto C Board	M31	YFV5RA0063A4	M80	YFV5VA0039A2
PCB16	Mother Board	M32	YFV2TA0068A4	M81	YFV2PA0106A3
PCB16-1	Mother VIC Board	M33	YFV5RA0064A4	M82	YFV2PA0107A3
PCB17	Sync Board	M34	YWA620AER01	M84	2X22SUS303
PCB18	Lens Control Board	M35	YFV2PA0101A4	M85	YFV5JA0010A1
PCB19	Zoom Switch Board	M36	YFV2TB0066B3	M86	YFV2SA0196A4
PCB20	REC Switch Board	M37	YFV5VA0038A3	M87	YFV5EA0327A3
PCB21	Iris VR Board	M38	YFV2TA0067A3	M88	YFV4JA0099A4
PCB22	Return Board	M39	YFV1FA0021B4	M89	YFV6JA0026A4
PCB23	ATW Board	M41	YFV6AA0012A2	M90	YFV2SA0195A4
V1-3	S4701A	M42	YFV6AA0013B2	M91	YFV5KA0065A3
L1	YFELY13A303B	M43	YFV2SA0199A4	M92	YFV2SA0195A4
L2,3	YFELY13A303C	M44	YWCC704FM02	M93	YFV5RA0048A4
SW1	YFE-2013	M45	YWCC704WM07	M94	YFV6JA0035A4
SW2	YFE-2022	M46	YFV5MA0002B4	M95	YFV5JA0009A1
SO1	YFTCB-S2	M47	YFV5EA0326A3	M96	YFV5GA0034A4
CN1-1	S8-622J-607			M97	YFV5YA0020B3
CN1-2	S8-622J-604			M98	YFV2SA0197A4
CN1-3	S8-622J-604			M100	YFV7PA0030A4
CN2	YFV3LENSCA				YFV7PA0032A4
CN3,4	YW-SJ296			M101	YFV7QA0854A4
CN5	YWQMA1221B				YFV7QB0854A4
CN6	YFXLR432F512				YFV7QA0856A4
CN7	YFVEE014SA			M102	YFV7PA0031A4
CN8	YWBNC-R				YFV7PA0033A4
CN9	YWLJ145-1A			M103	YFV2SA0201A4
CN11	YFEVFCNV3			M104	YFV7MA0099A4
CN12	YFR038F3			M105	YFV7MA0260A4
CN13	DO-111N-604			M108-1~9	YFV7QA0853A4

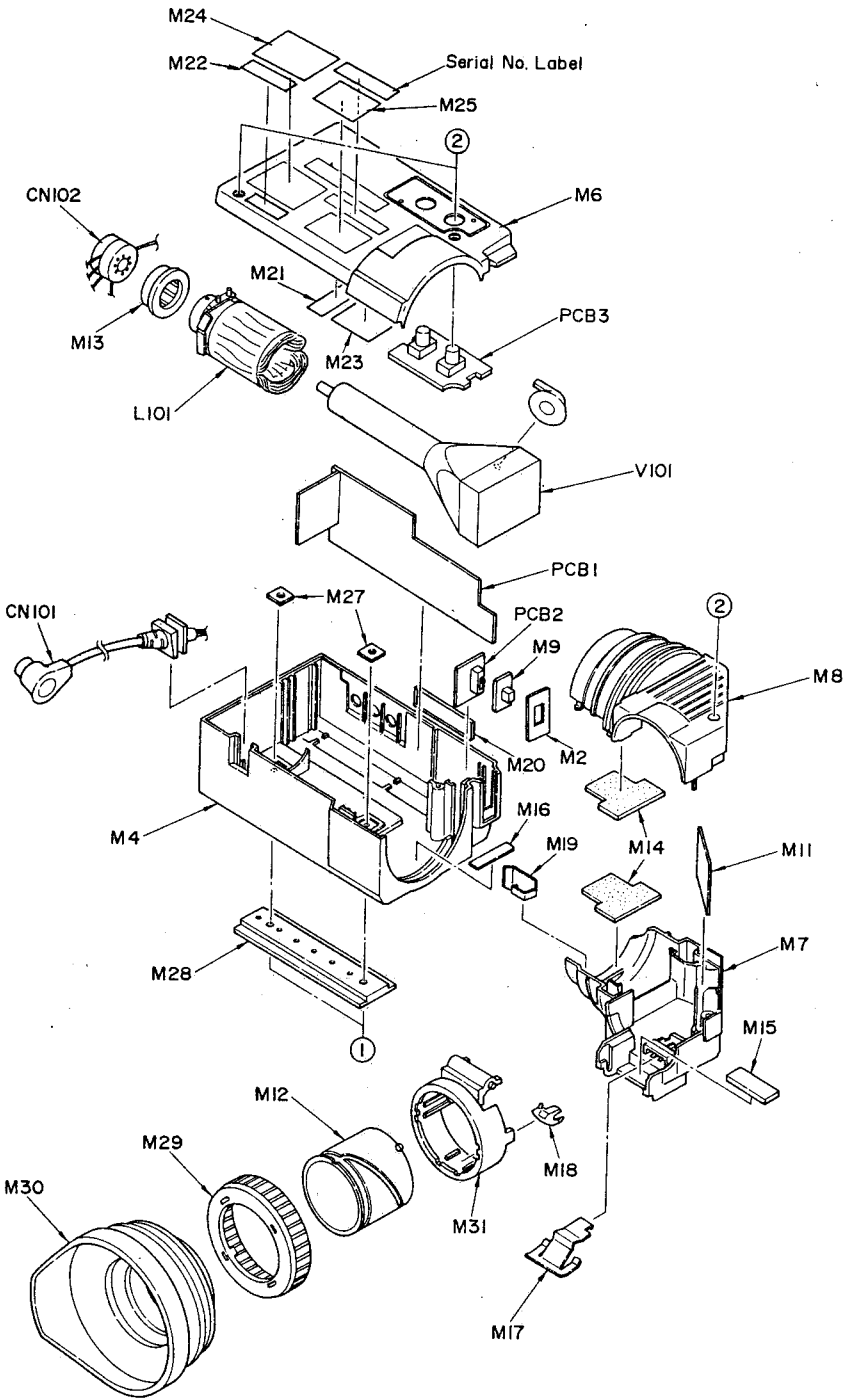
EXPLODED VIEW

EVF (WV-VF34)

ZOOM LENS/MICROPHONE

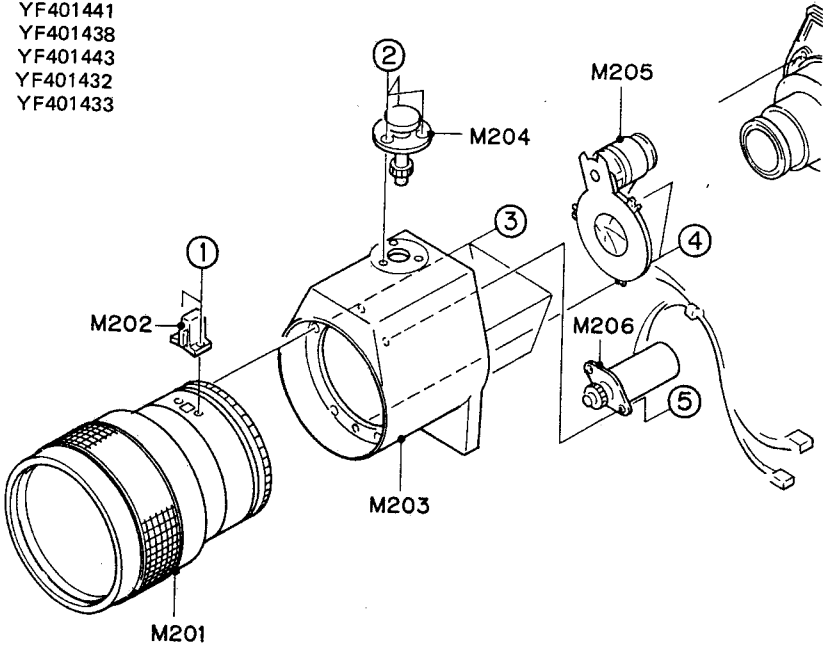
○ Numbers show screws.

No.	Screws	Description
①	XSS26+6FXK	Flush Head Machine Black Screw
②	XYN26+25BFXK	Machine Screw and Washer Screw

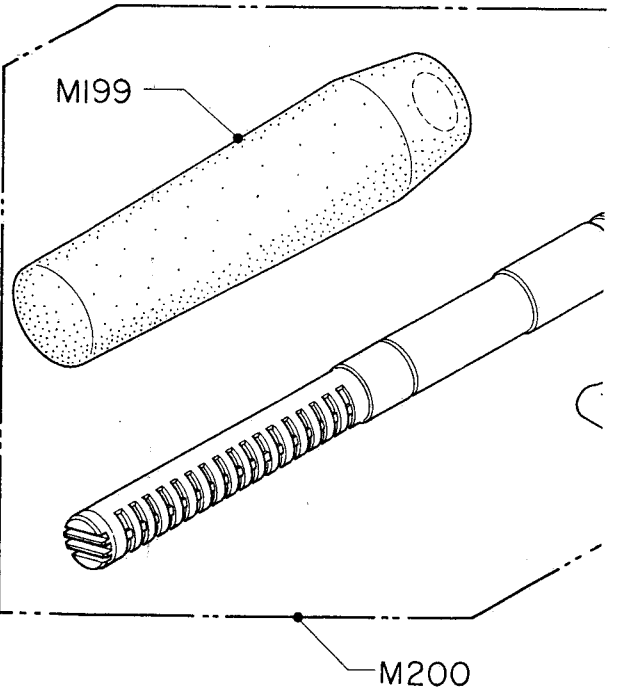


PCB1	EVF Board
PCB2	EVF Tally Switch Board
PCB3	EVF VR Board
V101	40JB4
L101	ELY15V113C
CN101	E8-130J-602
CN102	YFS7506P625
M2	YFV5WA0236A4
M4	YFV5EA0328B2
M6	YFV5EA0329B2
M7	YFV5EA0330A2
M8	YFV5EA0331A2
M9	YFV5RA0035A4
M11	YFV1UA0004A4
M12	YFV9AA0276AN
M13	YFV2FA0014B4
M14	YFV2FA0049B4
M15	YFV2FA0053A4
M16	YFV4JA0049A4
M17	YFV4JA0059A4
M18	YFV4JA0098A4
M19	YFV2VA0010A4
M20	YFNA326PB-9
	YFNA317NB-10
M21	YWS-WULRB03
	YFV7MA0057A4
M22	YWS-XEGRB03A
M23	YWS-WULRB03
M24	YFV7MA0099A4
M25	YFV7QA0858A4
	YFV7QA0860A4
M27	YFV1FA0008A4
M28	YFV2EA0032A4
M29	YFV3FA0026A4
M30	YFV5GA0038A4
M31	YFV3CA0062A3

M201	YF401402
M202	YF616129
M203	YF401442
M204	YF401437
M205	YF401441
M206	YF401438
M207	YF401443
M208	YF401432
M209	YF401433



M199	YFM6CA0044A4
M201	WM-4067



EXPLODED VIEW

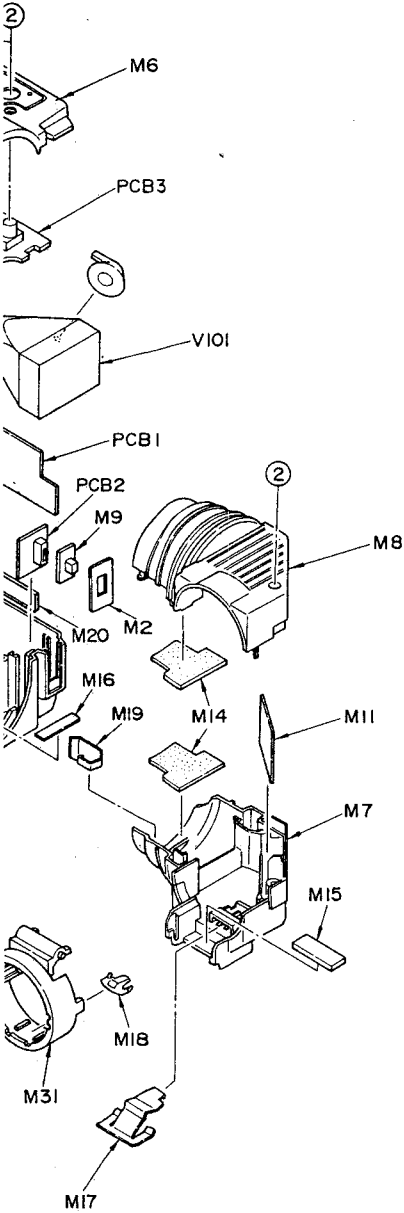
VF (WV-VF34)

○ Numbers show screws.

No.	Screws	Description
①	XSS26+6FXK	Flush Head Machine Black Screw
②	XYN26+25BFXK	Machine Screw and Washer Screw

Serial No. Label

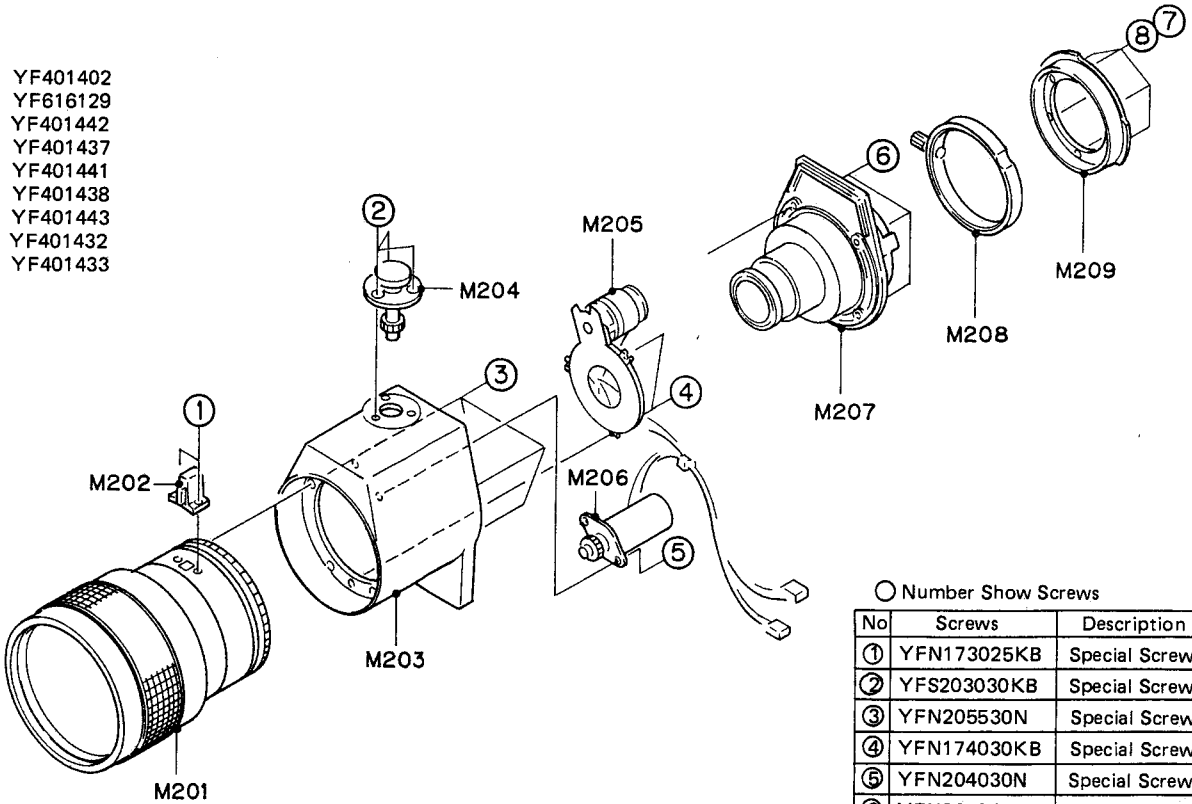
125



PCB1	EVF Board
PCB2	EVF Tally Switch Board
PCB3	EVF VR Board
V101	40JB4
L101	ELY15V113C
CN101	E8-130J-602
CN102	YFS7506P625
M2	YFV5WA0236A4
M4	YFV5EA0328B2
M6	YFV5EA0329B2
M7	YFV5EA0330A2
M8	YFV5EA0331A2
M9	YFV5RA0035A4
M11	YFV1UA0004A4
M12	YFV9AA0276AN
M13	YFV2FA0014B4
M14	YFV2FA0049B4
M15	YFV2FA0053A4
M16	YFV4JA0049A4
M17	YFV4JA0059A4
M18	YFV4JA0098A4
M19	YFV2VA0010A4
M20	YFNA326PB-9
M21	YFNA317NB-10
M22	YWS-XEGRB03A
M23	YWS-WULRB03
M24	YFV7MA0099A4
M25	YFV7QA0858A4
M27	YFV1FA0008A4
M28	YFV2EA0032A4
M29	YFV3FA0026A4
M30	YFV5GA0038A4
M31	YFV3CA0062A3

ZOOM LENS/MICROPHONE

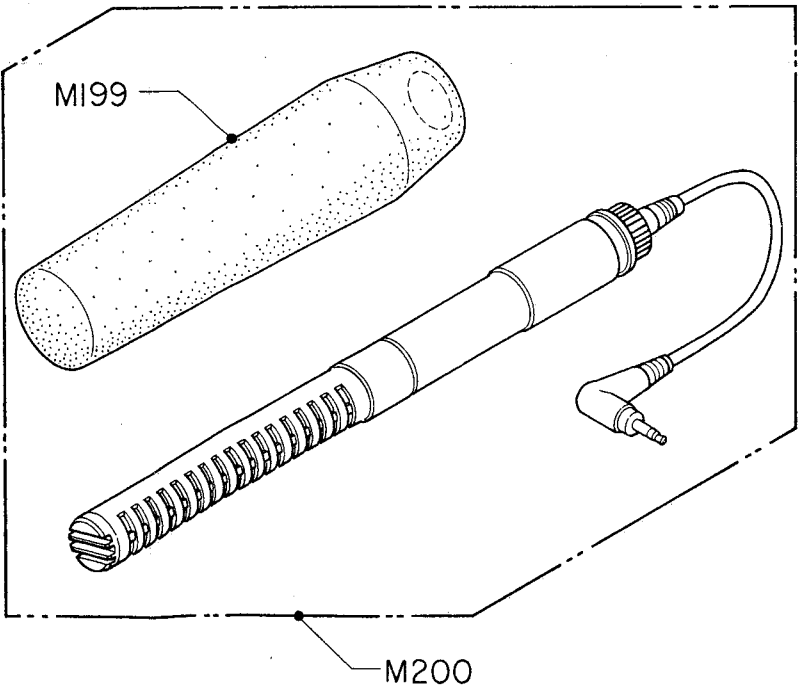
M201	YF401402
M202	YF616129
M203	YF401442
M204	YF401437
M205	YF401441
M206	YF401438
M207	YF401443
M208	YF401432
M209	YF401433



○ Number Show Screws

No	Screws	Description
①	YFN173025KB	Special Screws
②	YFS203030KB	Special Screws
③	YFN205530N	Special Screws
④	YFN174030KB	Special Screws
⑤	YFN204030N	Special Screws
⑥	YFN267045KB	Special Screws
⑦	YFH266045KB	Special Screws
⑧	YFH266045KB	Special Screws

M199	YFM6CA0044A4
M201	WM-4067



PACKAGING

